THE HYDROZOA OF THE SOUTH AND WEST COASTS OF SOUTH AFRICA. PART III. THE GYMNOBLASTEA AND SMALL FAMILIES OF CALYPTOBLASTEA

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(With 15 text-figures and 1 plate)

CONTENTS

INTRODUCTION

This paper represents the third and final part of a systematic account of the hydroids from that part of the South African coast stretching from South West Africa on the west to the southern border of Natal on the east. For details on the origin of the collections the reader is referred to the introduction to part I of the series (Millard, 1962).

When examining Gymnoblast hydroids one must bear in mind that a considerable quantity of the more delicate material brought up by dredging becomes destroyed by rough handling or is so badly damaged that identification beyond the genus level is impossible. Moreover most genera require the presence of gonophores, usually female, for identification to species level. This applies particularly to such genera as *Eudendrium* and *Tubularia*. It is felt that no useful

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purpose would be served by including dubious records and, at the risk of giving a false impression of the abundance, poorly preserved material and sterile material of doubtful specific identification has generally been omitted.

The author wishes to express thanks to the following: the South African Museum for permission to examine the collection of the s.s. *Pieter Faure*, the Zoology Department of the British Museum of Natural History for accommodation and permission to examine their collection in 1960, Dr. W. Engelhardt of the Munich Museum and Dr. J. S. Pringle of the Natal Museum for the loan of type material, Dr. M. E. Thiel of the Hamburg Museum for identification of certain medusae and finally all past and present members of the Zoology and Oceanography Departments of the University of Cape Town who have helped to accumulate material in the now very extensive University collection.

Type specimens of new species have been deposited in the South African Museum and have been given a Museum registered number in addition to the University catalogue number.

Station list

A. Littoral material from Oudekraal on the west coast of the Cape Peninsula. Position: 33°58·5′S/18°22·2′E.

	Date
A 40	16.1.34
A 116–122	15.3.34
A 139	17.3.34
A 353	
A 383	13.5.34
A 384	25.8.34
A 405	18.10.34

AFR. Material dredged by the government research vessel, R.S. *Africana*.

	Date	*Position*	*Depth (m.)*	*Bottom*
AFR 736	17.8.47	30°42·4′S/15°59·2′E	201	co gn S, Sh
AFR 801	7.10.47	32°34·4′S/17°52·2′E	71	gn M, R
AFR 866	9.1.48	34°36·8′S/19°16·4′E	38	R, S
AFR 967	23.3.48	35°07′S/20°49′E	91	f S
AFR 985	5.4.48	34°47·4′S/20°19′E	80	gn M
AFR 994	19 4.48	34°34·5′S/21°22·5′E	68	co S, Sh
AFR 0002	6.6.49	33°10′S/17°57′E	73	

B. Littoral material from Lambert's Bay on the west coast. Date: July 1938. Position: 32°05′S/18°18′E.

BMR. Bushman's River Estuary, south coast, on sand and muddy banks. Date: 14.9.50. Position: 33°41′S/26°40′E. Depth: 2–4·5 m.

BRE. Breede River Estuary, south coast, littoral. Date: 3.2.52. Position: 34°25′S/20°51·5′E.

CP. Littoral material from various localities on the west coast of the Cape Peninsula.

	Date	*Locality*	*Position*
CP 325	20.9.48	Sea Point	33°55·2′S/18°22·6′E
CP 327	16.12.48	Blaauwberg Strand	33°48′S/18°27·5′E
CP 331	8.8.49	Kommetje	34°08·5′S/18°19·4′E
CP 336	12.5.49	Oudekraal	33°58·5′S/18°22·2′E
CP 378	3.6.52	Cape Town docks (on *Squalus fernandinus*)	33°54·5′S/18°25·5′E
CP 646	5.12.60	Oudekraal	33°58·5′S/18°22·2′E

CPR. Material from various localities in the Cape Province.

	Date	*Locality*	*Position*	*Depth* (m.)
CPR 9	30.4.50	Glentana Strand	34°04′S/22°20′E	littoral
CPR 46	20.6.59	Umgazi Bay	31°43′S/29°26′E	27

HAM. Keiskama River Estuary, Hamburg, on the south coast. Date: 9.1.50. Position: 33°17′S/27°32′E.

HB. Littoral material from Hondeklip Bay on the west coast. Date: 8.2.40. Position: 30°19′S/17°16′E.

KNY. Knysna Estuary on the south coast. Position: 34°05′S/23°04′E (average).

	Date	*Depth* (*m.*)	*Bottom*
KNY 30	16.7.47	5–7	M, S
KNY 70	15.7.47	2–6	S
KNY 164	9.7.50	0–3	M
KNY 165	9.7.50	1–13	S
KNY 176	11.7.50		Floating buoy
KNY 212	7.7.60	0–1	S
KNY 270	14.2.64	0–1	M

L. Littoral material from East London on the south coast. Position: 33°01′S/27°54′E.

	Date
L 44	6.3.37
L 56–177	–.7.37

LAM. Dredged in Lambert's Bay, west coast.

	Date	*Position*	*Depth* (*m.*)	*Bottom*
LAM 24	16.1.57	32°04·6′S/18°18·15′E	17	R
LAM 30	19.1.57	32°05·1′S/18°17·7′E	20	R
LAM 35	19.1.57	32°05·5′S/18°17·7′E	27	R, Sh
LAM 46	22.1.57	32°04·4′S/18°17·7′E	23	R
LAM 50	23.1.57	32°08·5′S/18°17·7′E	16	R, S
LAM 52	21.1.57	32°04·7′S/18°18·2′E	17	S
LAM 59	23.1.57	32°09′S/18°18′E	16	R, S

LB. Langebaan Lagoon, west coast.

	Date	*Position*	*Depth* (*m.*)	*Bottom*
LB 127	26.4.48	33°05·6′S/18°01·6′E	Littoral	R
LB 166	15.7.46	33°09·0′S/18°03·4′E	7	
LB 266	3.5.51	33°07·4′S/18°02·1′E	Littoral	S

	Date	*Position*	*Depth (m.)*	*Bottom*
LB 296	5.5.51	33°04′S/18°00′E		Ship's hull
LB 314	4.5.51	33°05·7′S/18°01·5′E	Littoral	R
LB 371	7.5.53	33°05·7′S/18°01·5′E	Littoral	R
LB 378	7.5.53	33°05·9′S/18°01·9′E	0–1	Wooden piling
LB 380	7.5.53	33°06·7′S/18°01·0′E	4	S, Sh
LB 386	8.5.53	33°06·5′S/18°02′E		Ship's hull
LB 398	24.7.53	33°07·1′S/18°02·9′E	0–1	S
LB 403	5.12.53	33°10′S/18°03·5′E	Littoral	M
LB 542	4.5.60		Littoral	
LB 556	22.7.63	33°07·3′S/18°03·0′E	Littoral	Wooden piling

LIZ. Dredged in Algoa Bay, Port Elizabeth, south coast.

	Date	*Position*	*Depth (m.)*	*Bottom*
LIZ 2	5.4.54	33°55·7′S/24°37·2′E	9	M
LIZ 3	5.4.54	33°56·1′S/25°40′E	17	S
LIZ 7	6.4.54	33°58·1′S/25°38·9′E	9	R, St
LIZ 11	6.4.54	33°57·2′S/25°38·0′E	9	Clay, R
LIZ 13	6.4.54	33°58·2′S/25°38·8′E	7	S
LIZ 16	7.4.54	33°58·4′S/25°40·5′E	14	St
LIZ 24–25	11.4.54	34°00·4′S/25°44·5′E	39	co S, Sh
LIZ 40	11.4.54	34°00·8′S/25°42·4′E	6	R

LU. Littoral material from Luderitz Bay, South West Africa.

	Date	*Position*
LU 59	24.2.63	26°38′S/15°05·5′E
LU 113–118	22.2.63	26°38′S/15°09·3′E

MB. Dredged in Mossel Bay, south coast.

	Date	*Position*	*Depth (m.)*	*Bottom*
MB 8–12	12.1.56	34°04·3′S/22°13·9′E	19	R
MB 19	13.1.56	34°08·7′S/22°07·2′E	13	R, S, Sh
MB 25	13.1.56	34°09·3′S/22°10·1′E	29	S
MB 37	16.1.56	34°09·3′S/22°10·0′E	31	S
MB 47	17.1.56	34°11·3′S/22°10·0′E	10	R
MB 52	17.1.56	34°11·0′S/22°09·9′E	14	R, S
MB 55	17.1.56	34°10·7′S/22°09·6′E	9	R
MB 60	18.1.56	34°04·3′S/22°14·2′E	18	R, co S, Sh
MB 64	18.1.56	34°04·8′S/22°13·1′E	26	R, co S, Sh
MB 69	19.1.56	34°08·6′S/22°07·3′E	13	R, S
MB 70	19.1.56	34°08·9′S/22°07·9′E	18	S
MB 81	20.1.56	34°06·2′S/22°10·9′E	27	M
MB 84	21.1.56	34°11·4′S/22°10·1′E	29	R
MB 88	18.1.56	34°04·8′S/22°13·1′E	26	R, co S, Sh

OLF. Olifant's River Estuary, west coast. Date: 23.1.55. Position: 31°42′S/18°15′E.

PP. Littoral material from Paternoster, west coast. Date: 24.9.57. Position: 32°43′S/17°55′E.

SAMH. Material from the collection of the South African Museum. Specimens 147–352 and 361–383 were dredged by the s.s. *Pieter Faure*. Their positions were given in the original records as compass bearings off salient points

on the coast, and were probably not very accurate. These have been converted into latitude and longitude and are given to the nearest minute.

	Date	*Position*	*Depth (m.)*	*Bottom*
SAMH 147	23.6.1898	South of Mossel Bay		
SAMH 157–162	15.7.1898	34°08′S/22°16′E		St
SAMH 166–170	11.11.1898	33°49′S/25°56′E		
SAMH 174–177	19.11.1898	33°45′S/26°44′E	73–78·5	M
SAMH 179–180	22.12.1898	32°52′S/28°12′E		
SAMH 189	28.12.1898	33°09′S/28°03′E	86	R, S, Sh
SAMH 202–203	7.3.1899	33°59′S/25°51′E	24–27	
SAMH 214	24.3.1899	33°50′S/26°35′E	91	M
SAMH 221–227	19.6.1899	34°26′S/21°42′E		f S
SAMH 230–233	20.9.1899	34°15′S/22°10·5′E		M
SAMH 235	5.7.1900	34°27′S/20°58′E	51	Crl
SAMH 239–247	11.10.1900	34°08′S/22°59·5′E	73	Crl, S, Sh
SAMH 250–253	15.7.1901	33°13·5′S/27°58′E	89	brk Sh
SAMH 269–274	17.7.1901	33°07′S/27°47·5′E		f S
SAMH 283	25.7.1901	32°50′S/28°18·5′E	86	brk Sh
SAMH 296	13.8.1901	32°47′S/28°28′E	82	brk Sh
SAMH 315	10.9.1901	33°54′S/26°51′E	120	brk Sh, St
SAMH 327–328	22.9.1904	34°12′S/22°15·5′E	51	f S
SAMH 335–338	4.10.1904	34°12′S/22°15·5′E	51	f S
SAMH 341–343	19.10.1904	34°15·5′S/22°14′E	64	M
SAMH 351–352	22.8.1905	33°52′S/26°09′E		M
SAMH 357	19.6.1914	33°55′S/18°27′E		
SAMH 361	11.11.1898	33°49′S/25°56′E		
SAMH 380–383	15.3.1899	33°47′S/26°19′E	23	S, Sh, St
SAMH 404	–.4.1962	28°30′S/16°10′E	15	
SAMH 405–408	–.7.1962	28°30′S/16°10′E	15	

SB. Saldanha Bay, west coast.

	Date	*Position*	*Depth (m.)*	*Bottom*
SB 132	26.3.53	33°04′S/17°59·3′E	8	
SB 153–168	–.9.57	33°02·5′S/18°02′E	Littoral	R
SB 174	27.4.59	33°02·8′S/18°00·6′E	15	S, Sh
SB 178	28.4.59	33°03·6′S/18°00·4′E	15	R, kh S, Sh
SB 196	1.5.59	33°04·4′S/17°56·4′E	35	R
SB 231	4.5.60	33°00·6′S/17°59·6′E	8	R, kh S
SB 235	4.5.60	33°04·1′S/17°59·7′E	9	kh S
SB 267	25.4.62	33°02′S/17°57·2′E	22	kh S
SB 269	25.4.62	33°02·1′S/17°58′E	20	kh S, Sh

SCD. Dredged off the south coast.

	Date	*Position*	*Depth (m.)*	*Bottom*
SCD 5	19.4.58	34°15′S/25°05′E	11	R, Sh
SCD 20	26.5.58	34°07·3′S/23°23·8′E	46	R
SCD 22	26.5.58	34°26·7′S/23°26·0′E	114	Sh
SCD 26	23.5.58	33°47′S/26°04′E	47	M, Sh
SCD 29	22.6.58	33°38·6′S/26°54·7′E	56	R
SCD 37	19.5.58	32°15·2′S/28°57·7′E	49	R
SCD 50	18.5.58	31°38·8′S/29°34·4′E	33	R
SCD 52	20.8.58	34°01′S/25°45·5′E	46	R
SCD 56	19.8.58	33°37′S/26°56·6′E	46	
SCD 60	16.8.58	33°02′S/27°56·2′E	46	
SCD 61	15.8.58	32°17·7′S/28°54·5′E	49	
SCD 75	16.7.59	32°33′S/28°38′E	55	M, S
SCD 79–81	16.7.59	32°43′S/28°28′E	58	Sh, St

	Date	*Position*	*Depth (m.)*	*Bottom*
SCD 84–85	17.7.59	33°03′S/27°55′E	27	R
SCD 94	20.7.59	33°55·5′S/25°51′E	46	bk M, S
SCD 111	23.7.59	34°35′S/21°11′E	75	co S, Sh, St
SCD 112	20.7.59	33°55·5′S/25°51′E	46	bk M, S
SCD 113	26.11.59	34°24′S/21°45′E	27	S, f Sh
SCD 114	26.11.59	34°29′S/21°49·5′E	73	M
SCD 117–118	14.2.60	34°24′S/21°46′E	18	R
SCD 119	14.2.60	34°33′S/21°52′E	77	kh S
SCD 126	3.6.60	34°26·5′S/21°48′E	67	bk M
SCD 129–133	3.6.60	34°48′S/22°06′E	100	kh S
SCD 154	25.11.60	34°03′S/25°59′E	84	R
SCD 169	24.11.60	33°58·9′S/25°41·4′E	7	R
SCD 175	30.11.60	34°20′S/23°31′E	110	R, kh S
SCD 179	24.11.60	33°58·9′S/25°41·4′E	7	R
SCD 188	30.11.60	34°10′S/23°32′E	97	gn M
SCD 190	29.11.60	34°05·8′S/23°23·2′E	10	f S
SCD 206	30.11.60	34°51′S/23°41′E	182	kh S
SCD 215	25.11.60	34°03′S/25°58′E	78	S, Sh
SCD 239	29.11.60	34°02·0′S/23°28·4′E	49	M, R, S
SCD 258	14.7.61	33°53·8′S/25°42·5′E	32	f S
SCD 265	14.7.61	33°48′S/25°47′E	27	bl M, R
SCD 276	14.7.61	33°53·8′S/25°42·5′E	32	f S
SCD 281–283	11.2.62	34°04′S/23°23′E	22	f S, Sh
SCD 284	6.2.62	33°01′S/27°55′E	7	f S
SCD 312	9.2.62	33°58′S/25°47′E	48	f S
SCD 314	9.2.62	33°58′S/25°43′E	36	f M
SCD 328	10.2.62	34°43′S/25°40′E		Floating buoy
SCD 330	11.2.62	34°03·5′S/23°23′E	15	f S
SCD 333	11.2.62	34°02′S/23°27′E	42	M
SCD 347	12.2.62	34°10′S/22°15′E	54	M
SCD 354	11.10.62	32°08′S/29°12′E	210	
SCD 387	8.12.62	34°04·4′S/23°25·6′E	46	R
SCD 394	2.12.62	33°50·7′S/25°47·5′E	36	R, S

SH. Cape Town docks, from pylons and cable below tug jetty.

	Date
SH 433	14.4.61
SH 436	3.4.62

STJ. St. John's River Estuary, eastern coast of Cape Province. Date: 20.1.50 Position: 31°37′S/29°37′E.

SUN. Sunday's River Estuary, south coast. Date: 7.1.50. Position: 33°42′S/25°53′E.

SWD. Dredged off the coast of South West Africa.

	Date	*Position*	*Depth (m.)*	*Bottom*
SWD 12	10.2.63	26°35′S/15°01′E	71	R
SWD 39	12.2.63	26°37·5′S/15°04·5′E	40	R
SWD 42	13.2.63	26°38·0′S/15°00·2′E	71	R

TB. Dredged from Table Bay, Cape Town.

	Date	*Position*	*Depth (m.)*	*Bottom*
TB 6	4.8.46	33°49·5′S/18°27·5′E	13	S, Sh
TB 7–8	25.10.46	33°52·5′S/18°27·5′E	17	S Sh

	Date	*Position*	*Depth (m.)*	*Bottom*
TB 9	25.10.46	33°52′S/18°28′E	15	S
TB 13	4.8.46	33°49·5′S/18°27·5′E	13	S, Sh
TB 14	25.10.46	33°52·5′S/18°27·5′E	17	S, Sh
TB 15	11.2.47	33°47·5′S/18°24·3′E	19	S, Sh, St
TB 16	25.10.46	33°52′S/18°28′E	15	S
TB 17	26.6.47	33°52·7′S/18°28·7′E	9	S, St
TB 19	3.7.47	33°51·2′S/18°27·3′E	23	R, S
TB 21	15.12.57	33°48·6′S/18°24·6′E	15	S, Sh, St.

TRA. Material collected by commercial trawlers.

	Date	*Position*	*Depth (m.)*	*Bottom*
TRA 32	9.11.47	34°49′S/20°21·5′E	*c.* 91	
TRA 33	20.7.49	34°55′S/21°10′E	*c.* 90	R, S
TRA 35	21.1.50	34°34′S/20°50′E	70	M, S
TRA 38	–.7.50	34°30′S/20°56′E	73	M, S
TRA 42	–.7.51	34°30′S/20°55′E	*c.* 70	M, St
TRA 56	28.11.52	34°40′S/21°35′E	73	R, S
TRA 57	27.11.52	34°24′S/21°55′E	59	
TRA 59	26.11.52	34°28′S/21°45′E	70	S, St
TRA 86	23.3.53	32°41·7′S/17°58·5′E	9	S
TRA 92	–.1.54	35°03′S/21°50′E	110	R, S
TRA 99	18.1.56	34°25·5′S/21°50·2′E	60	S
TRA 150	6.3.58	34°42·2′S/20°25·0′E	91	M
TRA 156	15.10.58	34°12′S/18°22′E	22	Cable
TRA 159	6.7.58	33°56′S/25°36′E		Turtle

WCD. Dredged off the west coast of the Cape Province.

	Date	*Position*	*Depth (m.)*	*Bottom*
WCD 7	24.3.59	34°09·3′S/18°17·5′E	43	R
WCD 12	24.3.59	34°09·4′S/18°16·5′E	75	R
WCD 18	29.4.59	33°05·6′S/17°54·5′E	64	kh M
WCD 20	30.4.59	33°07·5′S/17°52·5′E	86	R
WCD 25	1.5.59	33°06·5′S/17°55·4′E	86	gn M
WCD 81	15.9.49	34°05′S/18°21′E	11	S
WCD 125	23.4.62	33°08′S/17°46′E	157	gn M
WCD 134	25.4.62	33°07·3′S/17°57·5′E	26	S
WCD 145	29.8.63	33°50·3′S/18°23·2′E	15	R
WCD 156	22.10.63	34°01·7′S/18°14·7′E	100	R
WCD 158–160	21.10.63	33°55·8′S/18°21·3′E	37	R
WCD 164	7.10.63	32°52′S/18°25′E	29	R

List of species

Family **Tubulariidae**

Tubularia solitaria Warren, 1906. *Tubularia warreni* Ewer, 1953.

Family **Myriothelidae**

Monocoryne minor n. sp. *Myriothela tentaculata* n. sp.
Myriothela capensis Manton, 1940.

Family **Corynidae**

Bicorona elegans, n.g., n.sp. *Staurocladia vallentini* (Browne, 1902).
Sarsia eximia (Allman, 1859).

Family **Solanderiidae**

Solanderia procumbens (Carter, 1873).

Family **Bougainvilliidae**

Bimeria vestita Wright, 1859.
Bougainvillia macloviana (Lesson, 1836).
Bougainvillia sp.
Dicoryne conferta (Alder, 1856).
Rhizorhagium robustum (Warren, 1907).

Family **Clavidae**

Clava sp.
Merona cornucopiae (Norman, 1864).

Family **Eudendriidae**

Eudendrium ?capillare Alder, 1856.
Eudendrium ?carneum Clarke, 1882.
Eudendrium deciduum Millard, 1957.
Eudendrium ramosum (Linn., 1758).

Family **Hydractiniidae**

Hydractinia altispina Millard, 1955.
Hydractinia kaffraria Millard, 1955.
Hydrocorella africana Stechow, 1921.
Podocoryne carnea M. Sars, 1846.

Family **Pandeidae**

Leuckartiara octona (Fleming, 1823).

Family **Aequoreidae**

Aequorea africana n. sp.

Family **Lovenellidae**

Lovenella chiquitita Millard, 1957.

Family **Haleciidae**

Halecium beanii (Johnston, 1838).
Halecium delicatulum Coughtrey, 1876.
Halecium dichotomum Allman, 1888.
Halecium halecinum (Linn., 1758).
Halecium ?muricatum (Ellis & Sol., 1786).
Halecium tenellum Hincks, 1861.

Family **Campanulariidae**

Campanularia hincksii Alder, 1856.
Campanularia integra MacGill., 1842.
Campanularia laminacarpa n. sp.
Campanularia ?mollis (Stechow, 1919).
Campanularia morgansi Millard, 1957.
Clytia hemisphaerica (Linn , 1767).
Clytia hummelincki (Leloup, 1935).
Clytia paulensis (Vanhöffen, 1910).
Obelia dichotoma (Linn., 1758).
Obelia geniculata (Linn., 1758).

Family **Tubulariidae**

Tubularia solitaria Warren, 1906.

Tubularia solitaria Warren, 1906: 83, pl. 10, 11. Millard, 1957: 179.

Records. West coast: A 122. LB 166 (recorded by Day, 1959). SB 153U. South coast: L 172.

Tubularia warreni Ewer, 1953

Tubularia warreni Ewer, 1953: 351, fig. 1–4. Millard, 1959*a*: 299. Millard, 1959*b*: 240.

Records. West coast: LB 296A, 386A (reported by Day, 1959). South coast: CPR 9G. KNY 176A (reported by Day, Millard and Harrison, 1952, as *T. ?betheris*).

Description. This material conforms to previous descriptions of the species with the exception of the CPR sample which differs in its paler coloration. The general effect, when alive, was a creamy colour, with pink tinges in the manubrium and gonophores. It is obviously a young colony, reaching a maximum height of 1·75 cm., and the largest hydranths measuring only about 2·5 mm. in length and 1 mm. in basal diameter. The blastostyles are unbranched and few in number (5–9) though fully mature gonophores are present. Apart from the colour there is nothing to distinguish it from *T. warreni*.

Family **Myriothelidae**

Monocoryne minor n. sp.

Fig. 1

Material. The holotype, SCD 215C, is a single specimen detached from its substratum and the only specimen known. Most of the colour has gone, though signs of a dark-red pigmentation are visible on the gonophores. South African Museum registered number: SAMH 410.

Description. Polyp measuring approximately 5 mm. in length, though somewhat contracted and curled up. Basal part of body (1 mm.) covered in transparent perisarc which is continued proximally in a number of threads and filaments, some of which appear to be filled with living coenosarc. Remainder of body cylindrical, bearing about 110 capitate tentacles. Tentacles solitary or arranged in groups of 2, 3, or 4 united at their bases. Length of tentacles variable: sometimes the middle one of a group of three is the largest as in *M. gigantea*, but sometimes all members of the group are equal in length and sometimes the first of a group of four is longest.

Eleven gonophores, apparently male, borne irregularly on the body of the polyp, the largest about 0·3 mm. in diameter. Gonophores pear-shaped, not distinctly demarcated from pedicel.

Nematocysts. At least three kinds visible in smears of preserved material:

(i) Desmonemes, the most abundant type. Capsule oval, thread with about 2 complete coils, on which a spiral ridging is visible. Size variable: 9·0–13·5 × 6·3–10·8 μ.

(ii) Stenoteles, fairly common. Capsule egg-shaped, with shaft occupying about half length. 15·3–18·0 × 13·0–15·3 μ.

(iii) Undetermined heteronemes, rare. Capsule elongated, with shaft occupying about $\frac{3}{5}$ length. 16·2–18·9 × 6·3–7·6 μ.

Remarks. As there is only one specimen available no sections were cut and accurate measurements could not be made without damage. A few detached

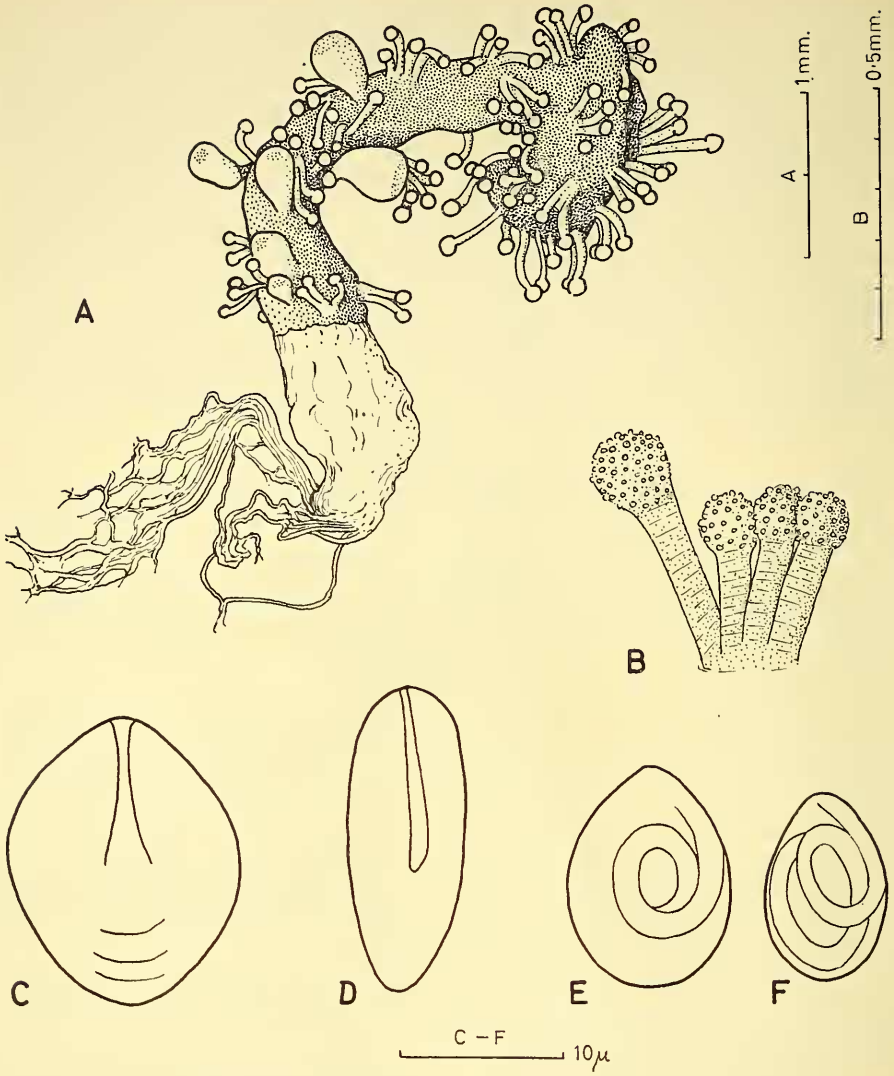

FIG. 1. *Monocoryne minor* n. sp.

A. The whole animal (holotype).
B. A typical group of 4 tentacles.
C–F. Nematocysts. (C, stenotele. D, undetermined heteroneme. E–F, desmonemes).

tentacles were used for examination of nematocysts. The specimen is fairly well preserved, but there is no knowing how many tentacles may have been broken off during handling, or whether the base was originally attached to a firm substratum. Since the tip of the body is curled over, the mouth could not be observed.

The arrangement of the tentacles differs from that in the only two known species of *Monocoryne*, namely *M. gigantea* (Bonnevie, 1898) and *M. bracteata* (Fraser, 1941), in both of which the middle one of a group is the largest. It is also much smaller than either of them. The gonophores are not seated in the axils of the tentacles but distributed at random over the body.

Myriothela capensis Manton, 1940

Myriothela capensis Manton, 1940: 276, pl. 1 (figs. 12, 13), pl. 3 (fig. 27), figs. 7, 8*b*, 9. Millard, 1957: 186.

Records. West coast: CP 331 (one almost mature male specimen attached to weed). LAM 52F (one mature female specimen attached to weed). LU 118Y (two mature male specimens torn from their base and two young specimens on crustacean appendage).

Description. The material from Luderitz Bay (LU 118Y) had retained its colour after about four months in spirit. The whole distal end of the body was a vivid splash of colour—the capita of the body tentacles and tips of the gonophores bright magenta, shading to pink on the stalks and colourless on the base of the polyp. Specimens preserved for a longer period are pale pink or completely colourless.

Largest specimen 1·6 cm. in length. Structure and nematocysts as described by Manton. One mature female specimen with actinulae larvae (one gonophore on opening contained three larvae). Female gonophores reaching 0·9 × 1·0 mm.

Myriothela tentaculata n. sp.

Fig. 2.

Material. WCD 7Q: 5 specimens from west coast attached to encrusting polyzoan, two of them rather badly damaged and the others in various states of preservation. The best preserved was selected as the holotype and another was used for sectioning. South African Museum registered number of holotype: SAMH 411.

Description of holotype. Total length 2·5 cm. No colour left in specimen except for a circle of dark-red spots round the distal end of each gonophore.

Basal region of hydranth (8 mm.) naked and drawn out into an irregular shape, bearing about 9 chitinoid, flattened, adhesive discs attached to the substratum.

Above this a single whorl of 17 long, tapering blastostyles reaching a maximum length of about 2 cm. These are generally somewhat coiled and bear a superficial resemblance to the tentacles of an octopus. They are the most distinctive feature of the species. Blastostyle unbranched, bearing 4–6 gonophores in the proximal 5 mm., of which the most distal is the oldest and the others in various stages of development. Capitate tentacles present amongst the gonophores and others (about 25) scattered irregularly over the distal region of the blastostyle. Tentacles rather poorly developed and resembling boot-buttons. Gonophores male, spherical, reaching a diameter of about

2 mm., each with a very short pedicel and 8–10 pigmented spots around distal end.

Distal region of hydranth (about $\frac{3}{5}$ of length) covered with densely packed capitate tentacles and bearing a terminal mouth. Tentacles well-developed, with slender stalks and large capituli, but more poorly developed in the region of the blastostyles.

Nematocysts. Four types distinguishable from smears and sections:

(i) 'Heteronemes' (fig. 2D), elongated and banana-shaped, with an axial body which stains red in Mallory's stain and a fine much-coiled thread. 44·1–45·9 × 8·1 μ.

(ii) Desmonemes of two sizes (fig. 2E–H), the larger 17·1–18·0 × 12·6–14·4 μ, the smaller 10·2–10·8 × 7·2–7·7 μ. In both, part of the thread stains red in Mallory's stain, the rest remains unstained. It bears a distinct spiral marking which may indicate the presence of barbs. The larger form contains a thread in 3 complete longitudinal coils and the smaller a thread in 2 coils.

(iii) Stenoteles (fig. 2C). Oval capsules containing a butt which stains red in Mallory's stain and increases in diameter towards the base. The thread is coiled transversely in the lower half of the capsule and forms an opaque mass in this region. A few were found exploded and showed a characteristic butt, though the thread and spines had been broken off. 14·4 × 10·8 μ.

(iv) Atrichous isorhizas (fig. 2B). Elongated capsules with the contents difficult to discern, but apparently containing a long tangled thread which stains faintly blue in Mallory's stain. 15·3–19·8 × 4·0–7·2 μ.

Histology. The hydranth body wall (fig. 2M) is very similar in structure to that of *M. capensis*. It is 110–180 μ thick, with a fairly thin layer of mesogloea 10–20 μ thick from which slender lamellae bearing muscle fibres project into the ectoderm. The lamellae arise at intervals of approximately 14 μ and are 40–80 μ deep. From the endoderm arise villi anything up to 1 mm. in depth, each containing a very thin supporting lamella of mesogloea. The apical cells of the villi contain dark-staining granules, but the remainder are clear and vacuolated. 85 villi were counted in one section. In the region of the mouth the granular cells are more numerous and many cells contain droplets of a yellowish material.

The body tentacles (fig. 2K) are exactly like those of *M. capensis* as described by Manton (1940), with an apical pad of mesogloea fibrils about 50 μ in thickness and a central cavity which passes into the stalk without constriction. The endoderm of the stalk is separated from that of the hydranth body by a thin layer of mesogloea. The capita of the tentacles are richly armed with nematocysts of all 4 types, of which desmonemes are the most numerous.

The blastostyle is the most distinctive structure in the species. In the proximal region where the gonophores arise the endoderm bears villi which

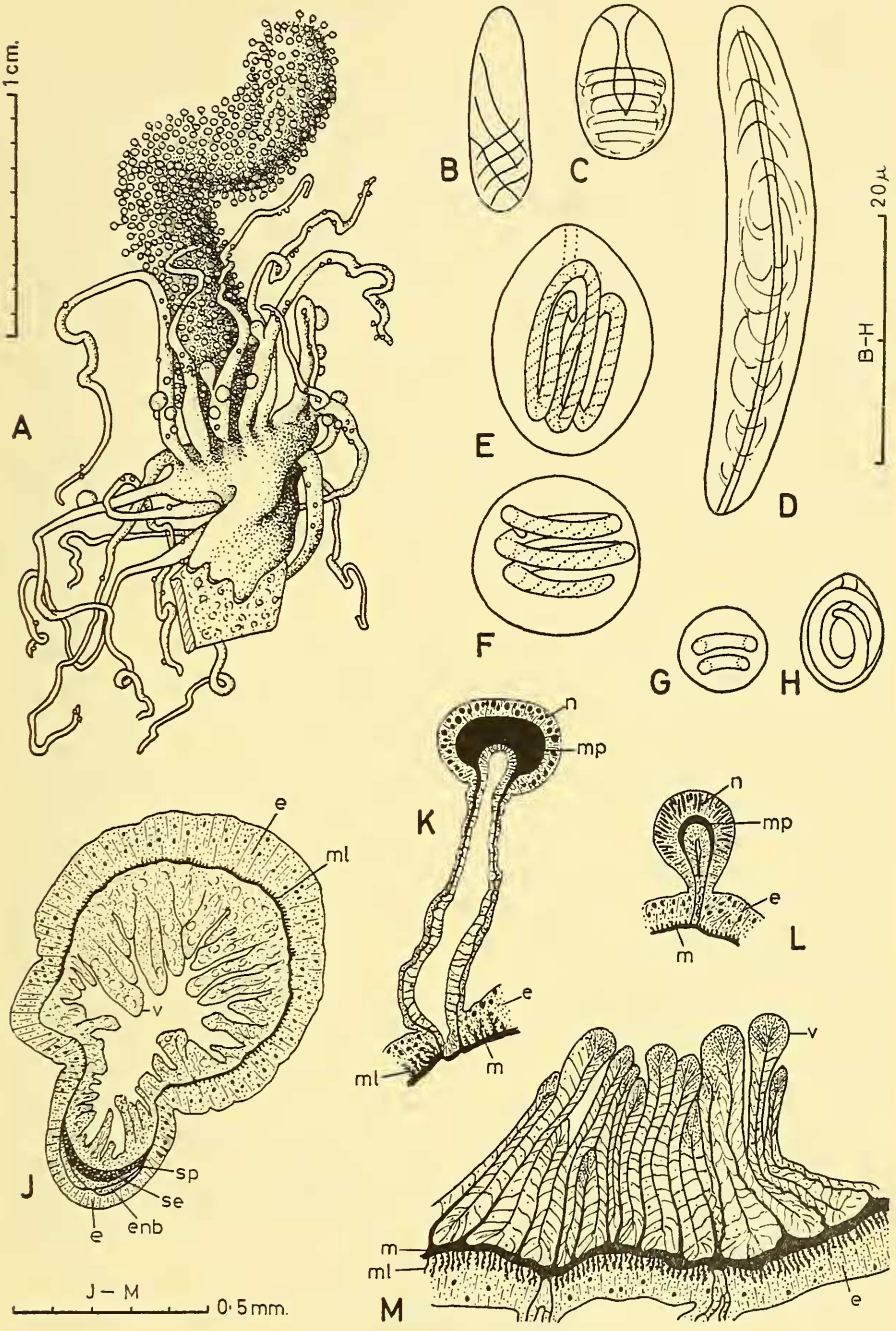

FIG. 2. *Myriothela tentaculata* n. sp.

A. The whole animal (holotype).

B–H. Nematocysts. (B, atrichous isorhiza. C, stenotele. D, 'heteroneme'. E and F, large desmoneme in side view and end-on view. G and H, small desmoneme in end-on view and side view.)

J. t.s. blastostyle in proximal region with young male gonophore arising from it.

K. l.s. body tentacle.

L. l.s. blastostyle tentacle.

M. t.s. through body-wall of hydranth in distal region including the origin of 2 tentacles.

(*e*, ectoderm. *enb*, endoderm of bell. *m*, mesogloea. *ml*, mesogloeal lamella. *mp*, apical pad of mesogloeal fibrils. *n*, nematocysts. *se*, subumbrella ectoderm. *sp*, spermatogenic cells. *v*, endodermal villi).

project into the central cavity and fill it almost completely (fig. 2J). The cells of the villi are densely packed with granules which stain red in Mallory's stain, and many of the granules float freely in the interstices between the villi. The mesogloea bears lamellae about 20 μ deep on its ectodermal surface. The ectoderm contains many developing nematocysts which are particularly abundant around the origins of the tentacles. In the slender distal part of the blastostyle ectoderm and mesoderm are normal and well-preserved, but the endoderm appears to be largely senile. Although remains of villi and their mesogloeal lamellae can be recognised, most of the internal cavity is filled with dead cells and fragments of cells most of which have an opaque yellowish coloration.

The blastostyle tentacles (fig. 2L) are similar to those of the body, but each has a much shorter stalk and a thinner pad of mesogloeal fibrils (about 20 μ thick in maximum). The lumen is very narrow and the endoderm separated from that of the blastostyle by a basal lamella of mesogloea. The superficial layer of the capitum is densely packed with nematocysts, including 'heteronemes' and atrichs, while desmonemes and stenoteles appear to be entirely absent.

The structure and development of the gonophore is similar to that in other species (Briggs, 1929, 1931; Manton, 1940). Only male gonophores are present and the largest one sectioned is 1·24 mm. in diameter with a layer of spermatogenic cells 0·24 mm. thick around the spadix. It is apparently almost mature, for a velar invagination is present in the exumbrella ectoderm though not yet perforate. The endoderm of the spadix bears rounded villi which project into the central cavity which is continuous with that of the blastostyle.

Remarks. Of the six southern hemisphere species listed by Manton, (p. 288) this species is most closely related to *M. capensis*. It differs from it in its larger size, its adhesive structures, which are less obviously tentacular, and its long and tendril-like blastostyles.

The nature of the nematocysts supports the establishment of a new species. All are larger than the corresponding types in *M. capensis*, the banana-shaped 'heteronemes' being enormous, about 4 times those of *M. capensis* and over twice those of *M. penola* and *M. cocksi*. The presence of atrichs in the hydranth is unusual since in other species this type is confined to the actinula. The term 'heteroneme' has been used following Manton, although the only evidence that this type possesses a distinct butt is that of Allman (1876), and needs confirmation. No haplonemes could be identified in this material, and if present cannot be distinguished from stenoteles.

Family **Corynidae**

Genus *Bicorona* nov. gen.

Diagnosis. Corynidae with firm perisarc and upright, monopodially branched stems. Hydranths with two whorls of capitate tentacles. Gonophores in the form of fixed sporosacs borne on the body of the hydranth.

Bicorona elegans nov. sp.

Fig. 3

Types and records. Holotype: SB 161X (South African Museum registered number: SAMH 412), from Saldanha Bay on the west coast. Other records: A 116, 139, 353 (west coast); L 44, 56 (south coast).

Description of holotype. A luxuriant colony of upright branching stems reaching a maximum height of 5·8 cm., growing in the lower intertidal region of the shore.

Hydrorhiza embedded in sponge, branching and giving rise to upright stems. Stem unfascicled, with monopodial growth and terminal hydranths. Branches arising alternately, either bearing one terminal hydranth, or rebranching in a manner similar to the stem. Stem and branches covered with firm perisarc which is closely annulated throughout except for a smooth area on the origin of each branch. Hard part of perisarc terminating just below hydranth, but continued as a gelatinous layer onto the base of the hydranth.

Hydranth *Tubularia*-like, with two whorls of capitate tentacles. Aboral tentacles 10–21 in number in mature hydranths, usually with long and short tentacles alternating. Oral tentacles short, 4–7 in number. 'Neck' region of hydranth (below aboral tentacles) with indistinct longitudinal striations.

Gonophores in form of fixed sporosacs, borne on approximately 7 short blastostyles which form a whorl just distal to the aboral tentacles. Gonophores oval to spherical, 2–4 to a blastostyle, the oldest one terminal.

Histology (fig. 3K). Stem normal, with no endodermal canals, terminating in a swollen region in the last perisarcal segment.

'Neck' region of hydranth with longitudinally ridged ectoderm, surrounded by thick gelatinous sheath continuous with the perisarc of the stem.

Hydranth expanding at level of aboral tentacles, with spacious enteron. Ectoderm of hydranth normal. Endoderm specialized: immediately below aboral tentacles thickened and granular but with no indication of parenchyma, in the region between the two whorls of tentacles folded inward around supporting strands of mesogloea in the nature of endodermal villi, in region of hypostome thickened.

Tentacles solid, with central core of 'chordal' endoderm. Aboral tentacles with no 'supporting lamella' of mesogloea, and endoderm continuous with that of hydranth. Oral tentacles attached obliquely to hydranth body, with a 'supporting lamella' of mesogloea which may be incomplete in its aboral region.

Blastostyle hollow and tubular. Gonophores with a hollow spadix, without subumbrella cavity or radial canals. Female gonophore containing many small eggs arranged in a single series around the spadix (counts give numbers varying from 29 to 84). Eggs 0·05–0·10 mm. in diameter. Male gonophore containing a thick mass of spermatogenic cells.

Nematocysts (fig. 3H, J) all stenoteles, of 2 sizes: large ones reaching

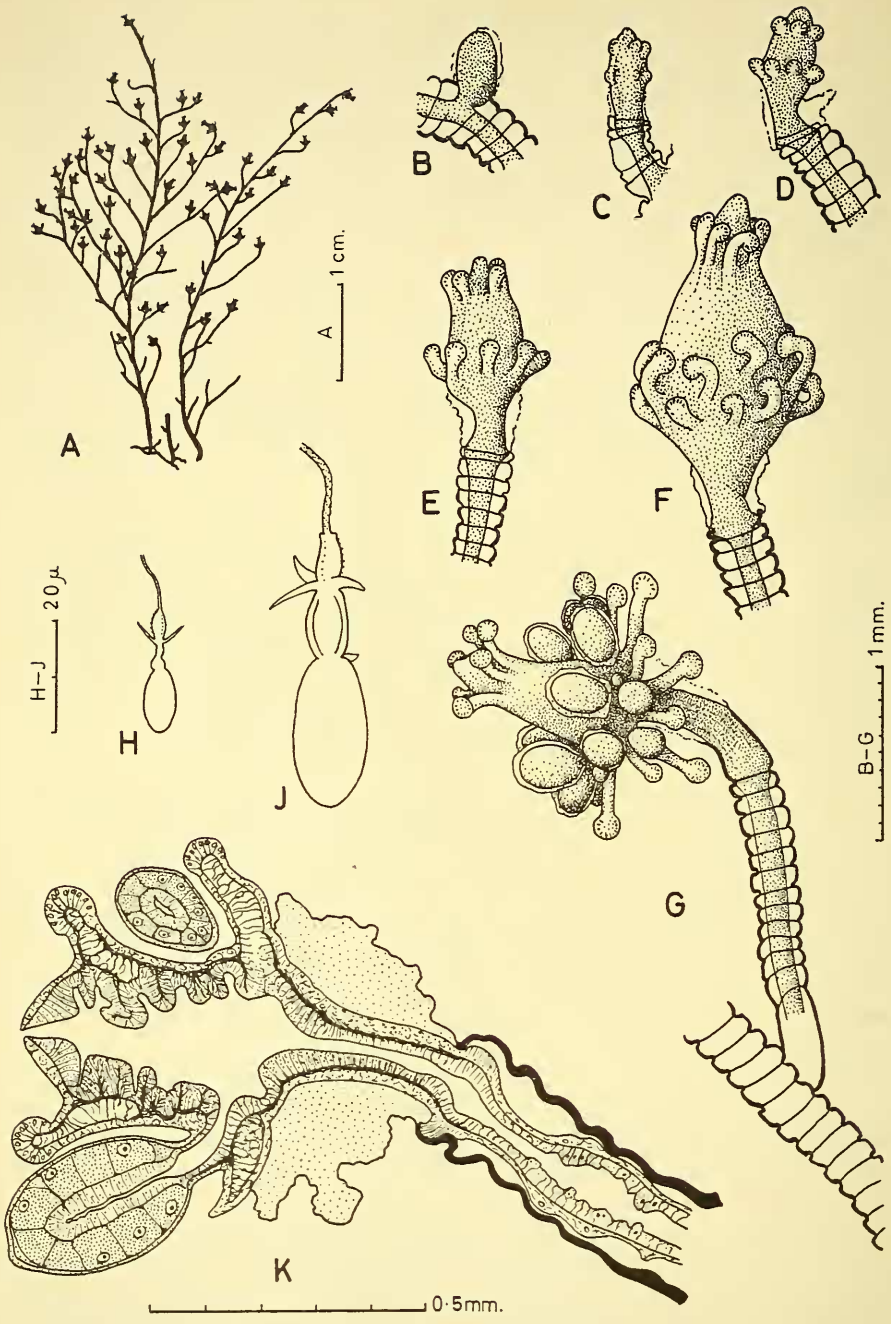

FIG. 3. *Bicorona elegans* n. sp.

A. Two complete stems from the holotype.
B–G. Stages in the development of the hydranth (B–F from A 139, G a mature hydranth from the holotype).
H and J. Small, and large, stenotele from A 116.
K. l.s. hydranth with female gonophores from L 44.

26 × 17 μ, small ones reaching 13·5 × 7 μ (measurements from preserved material, undischarged).

Measurements (mm., preserved).
(*N.B.* the holotype material is well expanded, A 116 less so.)

	holotype	*A* 116
Stem, diameter	0·21–0·35	0·26–0·43
Hydranth, length from end of 'hard' perisarc to hypostome	0·96–1·95	1·29–1·73
Gonophores, length reaching	0·47	0·50
maximum diameter reaching	0·44	0·36

Remarks. The material chosen as the holotype is a well-developed, mature colony, with presumably the maximum number of tentacles on the polyps. One of the other samples (A 139) contains shorter stems with younger, well-relaxed polyps, permitting observations on the origin of the tentacles (fig. 3B–F).

In the young polyp bud, two whorls of capitate tentacles appear simultaneously, 4–7 oral and approximately 7 aboral. These are at first short and knob-like, but they lengthen as development proceeds, especially the aboral ones. The number of oral tentacles is not increased, but before long a new series of aboral tentacles appears, about 7 in number, alternating with those of the first series and at a slightly lower level on the polyp. Polyps at this stage of development (fig. 3F) thus appear to have three whorls of tentacles, one oral and two closely alternating aboral. When the second series of aboral tentacles is about half the length of the first, young blastostyles make their appearance, one in the axil of each aboral tentacle of the first series. The oldest polyps in this particular sample have reached this stage, but the appearance of a third series of aboral tentacles would bring the number up to about 21 (the maximum number observed in the holotype). In the fully mature polyps of the holotype and other samples, however, the aboral tentacles are arranged in a single whorl and at one level (fig. 3G). Whether this is due to further growth in circumference of the polyp or to differences in the state of contraction can only be determined from living material.

Annandale (1915) established a new genus *Dicyclocoryne* for a species previously described in 1907 as *Syncoryne filamentata*, in which the generic diagnosis is the presence of two whorls of capitate tentacles. But *D. filamentata* bears free medusae and thus, following the practice adopted in these papers, cannot be included in the same genus as forms with fixed sporosacs. There are also other differences from the present species (e.g. unbranched stems, smooth perisarc, different position of gonophores) which make the establishment of a new genus for this material desirable, viz. *Bicorona*.

Dicyclocoryne and *Bicorona* appear to be more closely related to the Corynidae than to any other family of Capitata, and this is supported by the presence of only one category of nematocyst. Although stenoteles and desmonemes have

been reported from medusae of this family, only stenoteles (large and small) are known from the hydroids (Russell, 1938, and Millard, 1959b, for *Sarsia eximia*). In the Pennariidae on the other hand, with which *Bicorona* also has certain affinities, 3 or 4 different categories of nematocyst occur (Weill, 1934, and Millard, 1959a).

Sarsia eximia (Allman, 1859)

Coryne sp.: Millard, 1957: 179.
Sarsia eximia. Russell, 1953: 50, pl. 2 (fig. 3), figs. 17*a*, 18A, B. Millard, 1959*b*: 241. Kramp, 1959: 79, fig. 15. Kramp, 1961: 27.

Records. West coast: LB 556A. LU 113D. SH 433D, 436A. South coast: CPR 9F. KNY 165E (recorded by Day, Millard and Harrison, 1952, as *Syncoryne ?eximia*).

Remarks. Living material from Table Bay docks (SH 436A) and Langebaan (LB 556A) was kept in the laboratory where it released medusae. At liberation these measured 0·9 mm. in depth and 0·8 mm. in diameter, with a hypostome of 0·3 mm. in length. After 3 days the size had increased to 1·1 mm. depth and 1·2 mm. diameter, with a hypostome of 0·4 mm. At this stage the tentacles reached a length of about 1·8 mm. when extended and bore about 12 clusters of nematocysts. The structure was similar in every way to that of *S. eximia*. The medusa of *S. eximia* has not previously been recorded from South Africa.

Staurocladia vallentini (Browne, 1902)

Cnidonema capensis Gilchrist, 1919: 509, pl. 30.
Staurocladia vallentini: Browne and Kramp, 1939: 274, pl. 14 (figs. 3–4), pl. 15 (fig. 4), pl. 19 (fig. 2).
Cnidonema vallentini: Ralph, 1947: 414, pl. 35 (figs. 1–6).

Records. West coast: LB 266A, 398A (recorded by Day, 1959, as *Cnidonema vallentini*). A 40 (recorded by Bright, 1938, as *Eleutheria vallentini*).

Description. Material from Langebaan (LB) consists of numerous young medusae found crawling on weed (*Gracilaria confervoides*), most of them undergoing asexual reproduction. Medusae reaching a maximum diameter of about 1 mm., and bearing 20–30 tentacles. Aboral branch of tentacle with 4–5 nematocyst batteries, of which one is terminal and the rest dorsal. No gonads present.

Material from Oudekraal (A) includes two larger medusae, reaching a diameter of 3 mm. and bearing gonads. Specimens rather damaged, but apparently bearing over 40 tentacles. Nematocyst batteries as in LB material.

Hydranths not as yet found.

Family: **Solanderiidae**

Solanderia procumbens (Carter, 1873)
Fig. 4 and Plate I

Ceratella procumbens Carter, 1873: 10.
Ceratella spinosa Carter, 1873: 12.
Solanderia atrorubens: Marshall, 1892: 12, pl. 5, pl. 7 (figs. 2–4).

Solanderia procumbens: Vervoort, 1962: 535.
Solanderia spinosa: Vervoort, 1962: 535.
Non Dehitella atrorubens Gray, 1868.

General. The material of this species is divisible into two forms on general appearance (here designated as form A and form B), which do not seem to be specifically distinct, but are kept separate in case they should later prove to be so. In the description which follows the skeleton of the largest specimen of each (WCD 158F and E respectively) is described and the soft parts of the best preserved (SAMH 247).

Records

Form A: West coast: WCD 158F. South coast: SAMH 247. TRA 59A.
Form B: West coast: WCD 158E. South coast: SCD 154A.

Description, form A. The largest colony (Plate IA, left) a magnificent fan-shaped specimen 33 cm. high with a spread of 38 cm. Hydrorhiza 5 cm. broad, and flattened below for attachment. Main stem flattened in the plane of branching and expanding from a base 2·4 cm. wide and 1·2 cm. thick to a broad leather-like blade 5 cm. wide and 0·5 cm. thick; beyond this giving rise to a number of large branches, which in their turn branch and rebranch. Branching in one plane, with a tendency for the branches to bend to one side and give off more sub-branches on this side, suggesting the influence of a strong current during growth. Method of branching variable, often dichotomous, sometimes alternate and sometimes unilateral. Smaller branches quite round in section, comparatively thick and stumpy (about 2 mm. in diameter), with rounded tips.

Fibrous meshwork of main stem reticulate, with rounded, rectangular, or hexagonal apertures between the trabeculae, but no marked longitudinal arrangement. Trabeculae of unworn areas bearing numerous spiny structures 0·3–0·4 mm. in height, some of them flattened and spatulate and resembling abortive hydrophores with one or two supporting ribs (fig. 4D).

Fibrous meshwork of branches arranged in a more definite fashion, in which the longitudinal trabeculae predominate. Groups of trabeculae often raised up into prominent longitudinal ridges surmounted by blade-like crests parallel to the long axis of the branch (Plate IB, lower right corner). Spines reduced to tubercles on the branches and absent on the smallest subdivisions.

Hydrophores numerous and scattered irregularly over surface of branches. A typical one consisting of a scoop-shaped bracket supported on its lower surface by longitudinal ribs continuous with the trabeculae of the branch (fig. 4B). Ribs normally not reaching margin, which is smooth and rounded. Hydrophores, however, subject to much variation, some being bilobed (fig. 4C), some divided into two halves (one on each side of the hydranth) and some represented by a laterally seated hemihydrophore only. Badly eroded hydrophores with margin worn down between the supporting ribs (fig. 4H). Normal hydrophores approximately 0·5 mm. in length, and 0·5 mm. in basal width tapering to 0·3 mm. at margin.

Hydranths arising from coenosarc above hydrophores and, rarely, directly from the stem with no protective supports whatever; bearing approximately 15 capitate tentacles (but difficult to count due to poor preservation).

Gonophores arising directly from coenosarc of stem, spherical, shortly stalked. Immature male gonophores present on two specimens, the largest measuring 0·34 mm. in diameter and 0·32 mm. in length; containing several layers of spermatogenic cells around a central spadix, and 4 distinct radial canals.

Colour: stem and larger branches dark brown, occasionally with a purplish tinge, shading to yellowish-brown on the smaller branches.

Form B. Colonies smaller than form A, the largest reaching 19·5 cm. in height and 15·5 cm. in spread, with more slender branches and lighter coloration (Plate 1A, right). Main stem rounded in section. Hydrophores on smaller branches restricted to two sides, but irregularly scattered on larger ones. The 'double' type of hydrophore predominant (fig. 4E, G), bilobed or single ones rare (fig. 4F).

Nematocysts. Three types present in smears of preserved material:

(i) Large oval stenoteles (fig. 4R, S). Fairly common. Undischarged capsules with a broad, central shaft and a long thread coiled transversely in the lower half. Discharged capsules with a broad, slightly tapering butt armed with 3 large spines and several spiral rows of smaller spines. Thread broken off in all examples seen. 15·3–24·3 × 11·7–18·0 μ

(ii) Small oval heteronemes (fig. 4P). Abundant. Undischarged capsules with a central shaft and a thread which appears to be irregularly coiled. A single discharged and rather distorted capsule bore a short, swollen butt and a number of spines. 8·1–8·7 × 6·3 μ

(iii) Elongate-oval capsules of unknown category (fig. 4Q). Rare. Only discharged capsules seen with no sign of butt or thread. 15·3 × 5·4 μ

Remarks. It is felt that form A and form B represent different growth-forms of the same species, form B including younger colonies which have possibly grown more rapidly. Their main claim to distinction is the nature of the hydrophores which are predominantly 'single' in form A and 'double' in form B, although both types can be found in all colonies. There is no difference in the nematocysts. The 'double' hydrophore is in some ways similar to the 'spines' which flank the hydranth in *S. secunda* (Inaba). However, diagrams by Stechow (1909, pl. 4, fig. 7) and Vervoort (1962, figs. 2*b*, 7) show that the latter are little larger than the area of one mesh of the skeleton, whereas in the present material they approximate to the area of 4 meshes.

Carter's dried type material of *Ceratella procumbens* was available for comparison in the British Museum. It includes one specimen from the Cape of Good Hope (reg. no. 1867.3.22.1) and three from Natal (reg. no. 1872.8.1.1). The largest is one of the latter and measures 26·5 cm. in height with a spread

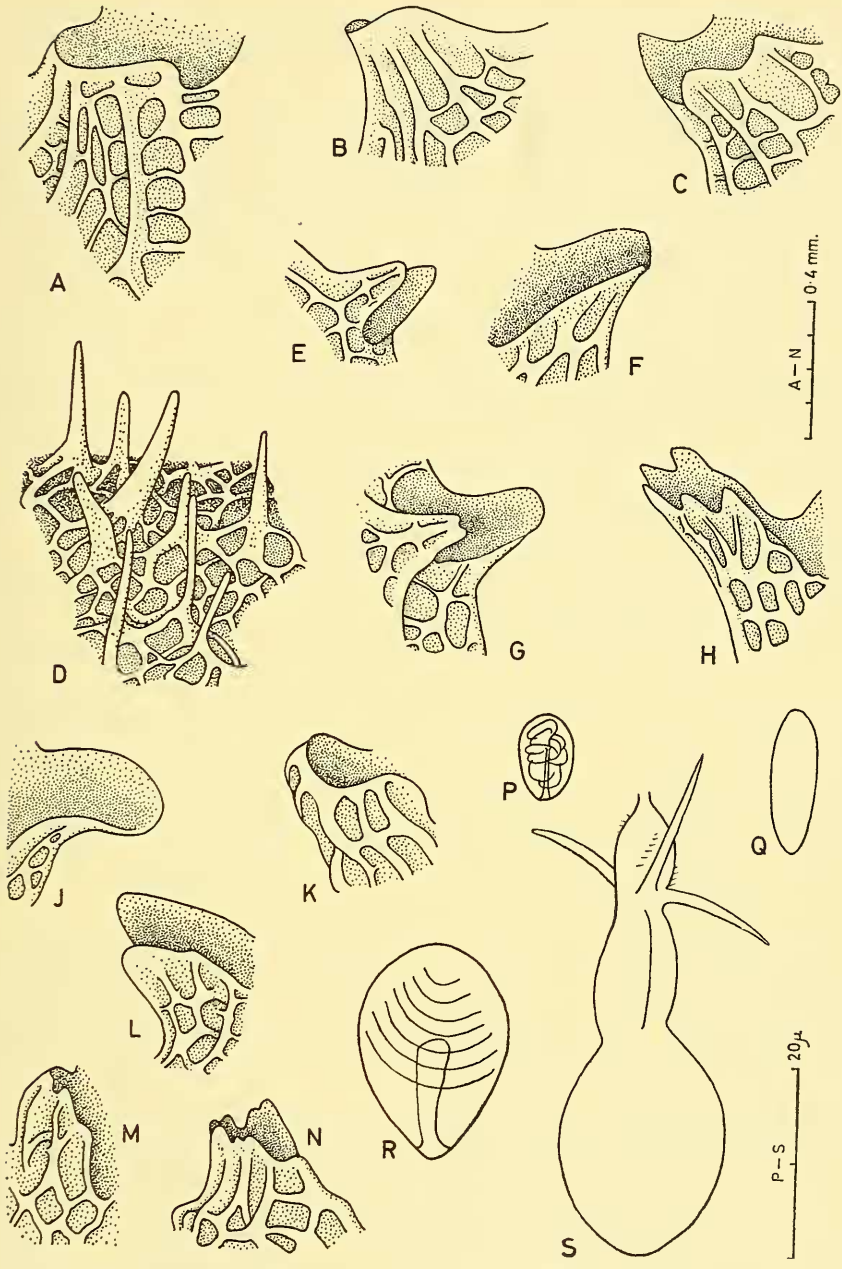

FIG. 4. *Solanderia procumbens* (Carter).

A–C. Hydrophores from form A, WCD 158F (A and B single, C bilobed).
D. A portion of the older part of the stem in WCD 158F showing spines.
E–G. Hydrophores from form B, SCD 154A (F single, E and G double).
H. A typical eroded hydrophore from False Bay.
J–N. Hydrophores from Carter's type material (J and K single, L double, M and N eroded).
P–S. Nematocysts (P, a small heteroneme. Q, undetermined type. R and S, large stenotele).

of 11 cm. The main stem is 1·8 cm. wide and 0·6 cm. thick. This is evidently the specimen whose measurements were quoted by Carter in 1873. I select it as the lectotype.

In spite of the fact that the type material is battered and obviously beach-worn the resemblance to form A described above is unmistakable. Here too the hydrophores are predominantly single (fig. 4J, K) though bilobed and double ones also occur (fig. 4L). In the older and badly worn parts the hydrophores are eroded so that the supporting ribs project and give a spinous appearance to the margin resembling that in *S. fusca* (Gray) (fig. 4M, N).

S. spinosa (Carter, 1873), is here considered to be a synonym for *S. procumbens*. The dried holotype of this species from Port Natal is also present in the British Museum (reg. no. 1872.8.1.17). It is less beach-worn than the type material of *S. procumbens* and this would account for the minor differences said to distinguish the species. Its general appearance is similar to form A described above though most of the hydrophores are of the 'bilobed' type. The 'spines', which are the main specific character, are present only on the older part of the colony as in the present material, and are comparatively delicate structures which would easily be rubbed off by sand erosion. This would account for their absence in the type material of *S. procumbens*.

Another species which possesses well-developed hydrophores is *S. fusca* (Gray, 1868), from Australia, described and figured by Spencer (1892). Gray's type material is present in the British Museum (reg. no. 1884.12.6.15–16; the first of these designated as lectotype by Vervoort (1962: 533). The most obvious characteristic of this species is the nature of the hydrophores which have spiny margins due to the projection of the supporting ribs beyond the edge. That this effect is not in this case the result of wear is evident from the fact that spiny hydrophores are present in the youngest and thinnest branches and, according to Spencer, also in the living animal.

S. atrorubens (Gray, 1868), is closely related to *S. fusca* and possibly a synonym, although Vervoort, 1962, considers that it can be distinguished by its method of growth. An examination of the type material in the British Museum, probably from Australia (of which no. 1962.4.14.1 has since been designated as lectotype by Vervoort, 1962, p. 535), showed that it has the same spiny hydrophores.

The fact that hydrophores of *S. procumbens* may acquire a spiny appearance as the result of erosion has probably led to confusion between this species and *S. fusca* and *S. atrorubens*. Marshall's record of *S. atrorubens* from Port Natal can be included in the synonymy of *S. procumbens* as his figures show that the edges of the hydrophores are smooth. Other species recorded from South Africa, including *S. labyrinthica* (Hyatt, 1877), and *S. rugosa* Marshall, 1892, and also Brazier's record (1887) of *S. atrorubens* are insufficiently described but are possibly all synonyms of *S. procumbens*.

Family **Bougainvilliidae**

Bimeria vestita Wright, 1859

Fig. 5 A–F

Bimeria vestita: Hincks, 1868: 103, pl. 15 (fig. 2). Allman, 1872: 297, pl. 12 (fig. 1–3). Hamond, 1957: 297, figs. 3–4.
Leuckartiara vestita forma *nana*: Vervoort, 1946*a*: 294.

Records. South coast: MB 88L. SAMH 158, 177, 233, 235, 327, 337, 343, 361. SCD 85T, 118M, 347F.

Description. Colonies epizootic on other hydroids, and reaching a height of 3–8 mm. Stem upright, bearing from 1 to 6 or 7 alternately arranged hydranth pedicels. Pedicels occasionally rebranching. Perisarc annulated at base of stem, on origin of pedicels and at other irregular intervals, covered throughout with adherent particles. Stem and pedicels narrower at base than at distal end. Perisarc continued over the hydranth, sheathing the tentacles for part of their length and covering the greater part of the hypostome. Tentacles varying in number from about 10 to 16.

Gonophores borne on the stem and hydranth pedicels, each on a short annulated pedicel, completely covered by a thick coat of gelatinous perisarc male and female on separate colonies. Male sporosac elongated-oval, with branching spadix. Female sporosac oval to spherical, bearing a single terminal ovum, which develops *in situ* into a planula larva (fig. 5 B–D).

Measurements (mm., preserved).

Stem, diameter			0·04–0·09
Pseudohydrotheca, length			0·21–0·49
	diameter		0·12–0·30
Gonophore, female, length (without perisarc)		reaching	0·16
	diameter	reaching	0·16
male, length (without perisarc)		reaching	0·33
	diameter	reaching	0·12

Remarks. These colonies are very similar to those described by Hincks, Allman and Hamond, although they are not so richly branched as some of Allman's specimens. The size of the hydranths and the thickness of the stem appears to be less than in most descriptions, though it corresponds well with Hamond's material.

The only previous record of this species from southern Africa is that of Vervoort, 1946*a*, from Inhaca in Portuguese East Africa. Female gonophores are apparently described here for the first time.

Bougainvillia macloviana (Lesson, 1836)

Perigonimus maclovianus: Vanhöffen, 1910: 284, fig. 10.
Bougainvillia macloviana: Jäderholm, 1923: 3. Millard, 1959*b*: 242, fig. 1 A–C. Vannucci & Rees, 1961: 69.

Records. West coast: SB 178D.

Description. Colony epizootic on other hydroids. Stems only 2 mm. in

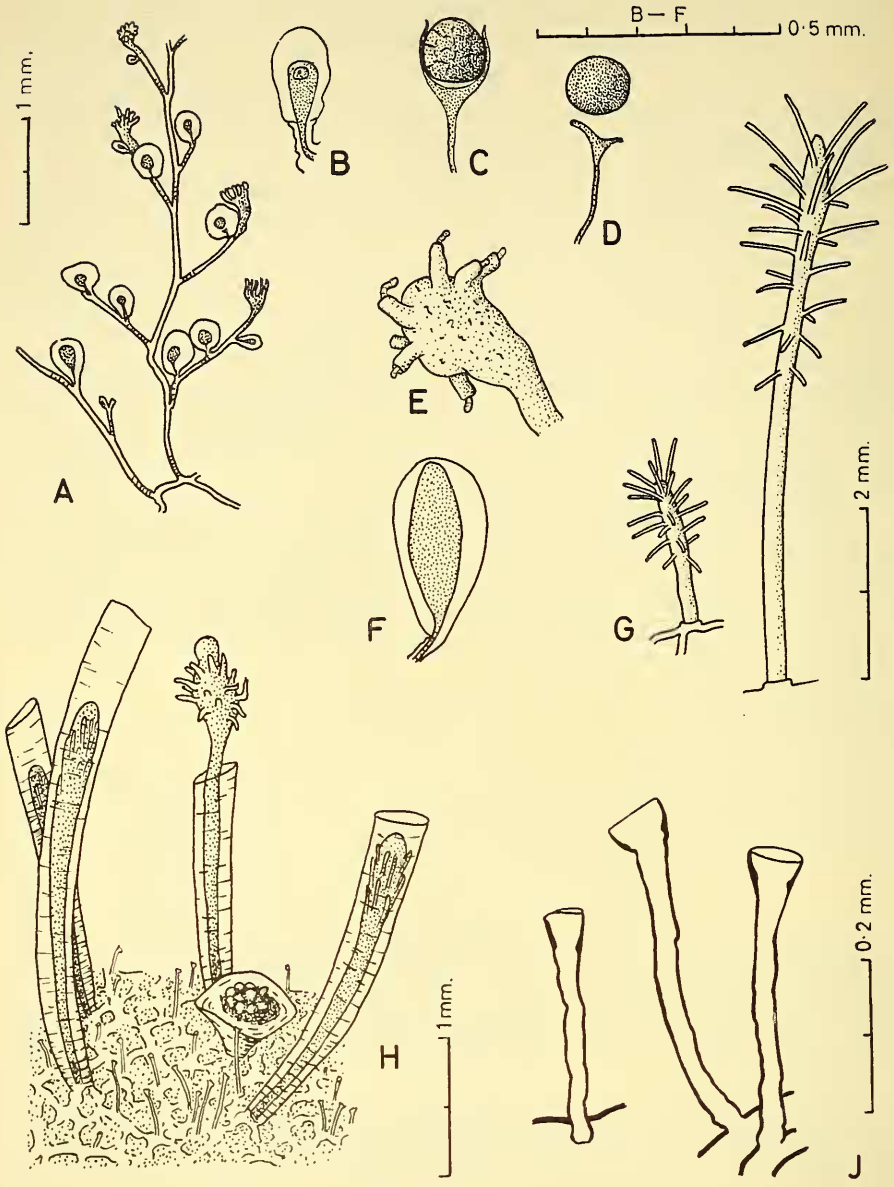

FIG. 5.

A–F. *Bimeria vestita* Wright. A, a typical stem. B–D, stages in the development of the female gonophore (C and D drawn without the perisarcal covering). E, a contracted hydranth. F, a male gonophore. (A–E from SAMH 361, F from SAMH 177).

G. *Clava* sp. Two hydranths sketched from living material (CP 646A).

H–J. *Merona cornucopiae* (Norman) from SCD 119R. H, part of the colony showing hydranths, a single blastostyle and nematothecae. J, three nematothecae on a larger scale.

height, slender, flexuous, branching irregularly, bearing medusa buds, of which the oldest has its tentacles unfurled.

Remarks. In its general appearance this colony strongly resembles Vanhöffen's description of the species and also the material previously described (Millard, 1959*b*). The identification is strongly supported by the discovery of abundant mature medusae of this species from the same area in Saldanha Bay (identification by M. E. Thiel of the Zoologisches Museum, Hamburg). It is interesting also that the two ships on whose hulls this species was recorded in 1959*b* both came from Saldanha Bay.

Bougainvillia sp.

Records. West coast: LB 542A. South coast: KNY 165D (reported by Day, Millard and Harrison, 1952, as *B. ramosa*). SAMH 170, 245. SCD 190A, 281G. TRA 33Z, 150F.

Description. Stems slender, upright, weakly fascicled at the base in the larger colonies and branching profusely in a more-or-less alternate fashion. Maximum height 5·3 cm. Larger stems generally smooth, smaller branches wrinkled or corrugated, particularly over the origins. Smaller colonies unfascicled and less profusely branched. Medusa buds with 4 unbranched oral tentacles and 4 marginal bulbs, each with 2 black ocelli and 2 marginal tentacles.

Remarks. It is felt that this material could not be assigned to a species with any certainty. The general growth-form is very similar in all the colonies, though some are obviously older than others. Well-developed medusa buds may be present on stems of only 3 mm. in height.

The stems are stiffer and more profusely branched than those of *B. macloviana*, yet not so sturdy as those described as *B. ramosa* (Millard, 1959*b*) from ships' hulls.

The material might well be included in *B. ramosa* forma *musca* Allman, 1864, yet no mature medusae of *B. ramosa* have so far been recorded from this country, whereas medusae of *B. macloviana* do occur on the west coast (see above).

Dicoryne conferta (Alder, 1856).

Eudendrium confertum Alder, 1856: 354, pl. 12 (figs. 5–8)
Dicoryne conferta: Allman, 1872: 226, 293, pl. 8. Jäderholm, 1909: 47, pl. 3 (fig. 6).

Records. South coast: SCD 133C.

Description. A dense colony growing on a gastropod shell occupied by a hermit, reaching a maximum height of 2·5 cm. Hydrorhiza reticulate. Stem unfascicled, branching irregularly, increasing slightly in diameter towards distal end. Perisarc roughly corrugated throughout, but more definitely annulated on origin of stem, terminating below hydranth when the latter is expanded and covering the base of the body as a 'pseudohydrotheca' when contracted. Hydranth long, with a single whorl of tentacles near distal end.

'Blastostyles' in the form of tentacle-less hydranths borne on stem and

hydrorhiza. Male gonophores present, borne on lower region of blastostyle either as a tight cluster or distributed along its length. The two tentacles of the swimming sporosac clearly visible within the perisarcal covering of the gonophore.

Nematocysts all small, 5·4 × 2·7 μ

Remarks. This appears to be the first record of the species from the southern hemisphere. The appearance of the colony is very characteristic and closely resembles that illustrated by Jäderholm in 1909.

Rhizorhagium robustum (Warren, 1907)

Parawrightia robusta Warren, 1907: 187, pl. 33 (figs. 1–5), figs. 1–4.

Records. South coast: L 177.

Description. A sterile colony growing on a coralline alga. Most stems bear a single terminal hydranth, but many 2 or 3. In some cases a number of stolons or stems (it is impossible to determine which) are twisted together simulating a fascicled stem which is quite free from the substratum and reaches a maximum height of 17 mm. Perisarc well developed and forming a very distinct 'pseudohydrotheca' over the base of the hydranth. Tentacles 18–22.

Family **Clavidae**

Clava sp.

Fig. 5G.

Records. West coast: CP 646A.

Description. Colony growing on a stone just below low tide level. Hydrorhiza reticulate, penetrating into calcareous matter on stone, covered with a thin layer of perisarc which forms a very low collar round the base of each hydranth.

Hydranths reaching a maximum height of 7 mm., creamy pink in colour when alive, with 22 to 30 scattered filiform tentacles which reach a maximum length of 1 mm. when fully extended.

Gonophores absent.

Nematocysts of two kinds:

(i) Microbasic euryteles, 0·67–0·72 × 0·22 μ.

(ii) Desmonemes, 0·45 × 0·32 μ

Remarks. This species cannot be definitely identified in the absence of gonophores. The trophosome is similar in size and all other characters to *C. multicornis* (Forskål, 1775), forma *genuina* Broch, 1916. The sizes of the two categories of nematocyst are also close to those given by Weill, (1934) for *C. squamata* (= *C. multicornis*).

Merona cornucopiae (Norman, 1864)

Fig. 5 H, J.

Merona cornucopiae: Rees, 1956: 499, figs. 1–3.

Records. South coast: LIZ 25P. SCD 119R.

Description. Colonies growing on the bivalve *Crassatella capensis Lamy*. Of the two samples recorded above the first consists of a single bivalve bearing a male colony of about 160 hydranths. The second consists of three bivalves bearing colonies of between 30 and 50 hydranths each, two of these colonies bearing female gonophores. In each case the colony is restricted to one corner of the shell.

Hydrorhiza in the form of an open reticulum at the margins of the colony, but consolidated into a mat in the denser regions.

Hydranths with 16 to 20 scattered filiform tentacles, surrounded by sturdy perisarcal tubes into which they can be completely retracted. Tubes slender at base, expanding distally, often regenerated.

Gonophores borne in clusters on blastostyles which arise separately from hydrorhiza, male and female on separate colonies. Blastostyle surrounded at base by short collar of perisarc.

The hydrorhiza of one colony only (SCD 119R, male) bearing numerous minute nematothecae. Nematotheca in the form of an asymmetrical perisarcal funnel borne on a long and slender pedicel. Containing a cluster of large nematocysts.

Measurements (mm.)

	SCD 119R	LIZ 25P
Perisarcal tube, height	1·83–4·25	2·15–2·72
maximum diameter	0·30–0·38	0·32–0·35
Blastostyle, total height	1·27–1·41	0·63
Gonophore, length	0·17–0·25	0·19–0·35
maximum diameter	0·12–0·20	0·12–0·21
Nematotheca, height	0·03–0·06	
maximum diameter	0·07–0·09	
length of pedicel	0·22–0·54	

Nematocysts. At least two types present:

(i) Microbasic euryteles. Elongated capsules measuring 16·2 × 4·5 μ undischarged. Abundant in nematophores, scarce on hydranth tentacles. A single discharged and rather damaged capsule observed.

(ii) ?Desmonemes. Ovoid capsules measuring 7·2 × 2·7–3·6 μ undischarged. Abundant on hydranth tentacles, scarce in nematophores.

Remarks. This species has so far been reported only from northern seas. It is a new record for South Africa and its presence here is surprising. Even more so is the discovery of nematophores on the hydrorhiza There can be no doubt about the identification of the species thanks to the detailed description of living material by Rees and the characteristic habitat of the animal.

The nematophores, when first noticed, were thought to be the hydrothecae of an epizootic species, but the microscope showed that they arose from the same hydrorhiza as the clavid 'host', a fact which was convincingly proved when the same nematocysts of identical measurements were found in both. A

noteworthy point is that nematophores occurred in only one colony (male) out of four which were similar in every way other than sex.

Family **Eudendriidae**

Eudendrium annulatum Norman, 1864.

Remarks. The only record of this species from South Africa is that of Ritchie (1909) from the entrance to Saldanha Bay, and that a doubtful one. In 1960 the opportunity offered to examine two slides of Ritchie's material from Saldanha Bay and to compare them with Norman's preserved type material of *E. annulatum*. In Ritchie's material the stem is not so densely annulated as in the usual conception of *E. annulatum*, although in the type material of the latter smooth areas do occur in some parts of the larger branches. More important is the fact that in Ritchie's material bifurcating spadices could be distinctly seen on some of the female gonophores, whereas in *E. annulatum* the spadices are unbranched (Broch, 1916, p. 62). Ritchie's record of *E. annulatum* from South Africa should thus be discarded, and the material is provisionally placed in *E. carneum* (see p. 455).

Eudendrium ?capillare Alder, 1856.

Eudendrium capillare Alder, 1856: 355, pl. 12 (figs. 9–12). Broch, 1916: 62. Stechow, 1925*a*: 202. Leloup, 1952: 124, fig. 63. Picard, 1955: 183.
Eudendrium parvum Warren, 1908: 272, pl. 45 (figs. 1–4), fig. 1.
Eudendrium ?parvum: Millard, 1959*a*: 305, fig. 1G, H.

Records. South coast: SCD 154K. SH 433A.

Description. SCD 154K: Stems unbranched or sparsely branched. Perisarc annulated at origin of stem and branches and often at other irregular intervals. Old female gonophores present on 'blastostyles' which arise from stem or hydrorhiza. Pedicel of blastostyle corrugated, bearing 3–5 gonophores or their empty capsules irregularly distributed near distal end. Gonophores covered by transparent capsule which has a warty appearance possibly due to shrinkage. Soft parts too badly preserved for nematocyst examination or tentacle counts.

SH 433A: Living material kept in laboratory for several weeks. Stems unfascicled, but profusely branched and reaching a maximum height of 1·7 cm. Perisarc annulated on origins of stems and branches and at other irregular intervals. Hydranths orange-pink in colour with white tentacles and hypostome; with 23–28 tentacles held alternately elevated and depressed. Various stages of female gonophores present on 'blastostyles' which arise from the stem or its branches. Pedicel of blastostyle corrugated. Young blastostyle with fully-formed hydranth and a ring of gonophores around its base; each gonophore with an unbranched spadix arching over a single egg. Older blastostyles with the hydranth showing signs of reduction and the gonophores more irregularly distributed, each gonophore without a spadix and bearing a single embryo surrounded by a transparent capsule. Nematocysts of two types: large isorhizas, 27 × 11·5 μ, and small heteronemes, 8 × 2·4 μ (undischarged).

Remarks. Warren's *E. parvum* is now considered to be a synonym for the cosmopolitan *E. capillare*. This conclusion is based on examination of—

(i) material of *E. capillare* from Marseilles bearing female gonophores and kindly supplied by J. Picard in 1958.

(ii) material of *E. parvum* from Knysna deposited by Warren in the British Museum (slides 22.3.6.104–107). This is obviously not the holotype, which came from Park Rynie, but is labelled co-type. Both male and female gonophores present.

Warren in 1908 summarised the differences between the two species. One of these was the presence of 3-chambered male gonophores in *E. parvum* as against two in *E. capillare*. But the basal chamber in *E. parvum* is very small indeed and its development may well be a matter of degree. Moreover, Alder in his original description of *E. capillare* mentions 2- or 3-chambered gonophores ('two or three capsules in linear series on each pedicle').

Another difference was the presence of a terminal tubercle on the male gonophore in *E. parvum*. This appears to be a variable character. It is present in only some of the gonophores in Warren's material from Knysna, and is apparently present or absent in *E. capillare* (Stechow, 1925*a*).

Further, Warren mentioned the extension of the perisarc over the base of the hydranth in *E. parvum*. This perisarc is very delicate and may well have been missed in earlier descriptions of *E. capillare*. It is visible in Picard's material of the latter from Marseilles.

Although Warren did not describe female gonophores in the holotype of *E. parvum*, they are present in his material from Knysna and are exactly like those of *E. capillare*.

Finally, the mention of small nematocysts only in *E. parvum* by Warren, 1908, and Millard, 1959*a*, is in agreement with Picard's statement (1955) that only small microbasic euryteles occur in *E. capillare*.

The presence of both large and small nematocysts in the present material (SH 433A) is the only reason for the query in the identification. One is loath to create a new species on the basis of nematocysts only, but one is forced to the conclusion that either there are two species with exactly similar female gonophores or that *E. capillare* has the potentiality of producing two kinds of nematocysts, which is not always realised.

Eudendrium ?carneum Clarke, 1882

?Eudendrium annulatum: Ritchie, 1909: 70.

Eudendrium carneum: Vannucci, 1954: 101, pl. 1 (figs. 1–9), pl. 2 (fig. 8), pl. 4 (figs. 2–5). Millard 1959*a*: 302, fig. 1A–F.

Records. West coast: A 118. CP 336A.

Description. Fascicled, branching stems reaching a maximum height of about 5 cm. Colonies more heavily annulated than is usual for the species, the groups of annulations on the main stem more common and more extensive, often with about 15 rings; hydranth pedicels usually completely annulated,

though some with smooth areas. Hydranths with 15 to 24 tentacles.

Young female gonophores with bifurcating spadices. Male gonophores 2-chambered.

Nematocysts of two types: large isorhizas, 20 × 9 μ, and small heteronemes, 7 × 4 μ.

Remarks. This material appears to be a smaller and more closely annulated form of *E. carneum*. The young female gonophores are exactly the same, though completely mature ones with basket-shaped capsules were not present. The male gonophores are 2-chambered, whereas material from the east coast had a minimum of 3 chambers (Millard, 1959*a*). However, Vannucci (1954) has described 2-chambered male gonophores in the same species.

The nematocysts are similar to those of *E. carneum*, though both types are slightly smaller. The presence of large nematocysts excludes the material from *E. racemosum* which also has a forked spadix in the female gonophore.

This material is very similar to that reported from Saldanha Bay by Ritchie (1909) as *E. annulatum(?)*. Ritchie's material also has bifurcating spadices. (See also p. 454.)

Eudendrium deciduum Millard, 1957

Eudendrium deciduum Millard, 1957: 184, fig. 2.

Records. South coast: LIZ 7R. MB 19R, 47N.

Description. No large nematocysts have been observed in this species. Small heteronemes (probably microbasic euryteles) similar to those of *E. carneum* (Millard, 1959*a*, fig. 1B) present, measuring 6·3–8·1 × 2·7–3·6 μ undischarged.

Eudendrium ramosum (Linn., 1758)

Eudendrium ramosum: Hincks, 1868: 82, pl. 13. Stechow, 1923*a*: 83. Weill, 1934: 388, fig. 237. Leloup, 1952: 127, fig. 64.

Records. West coast: AFR 0002E. South coast: SCD 37R (dubious identification).

Description. The first specimen (AFR 0002E) has long, graceful stems reaching 17·5 cm. Main stem fascicled, branches unfascicled and given off in a pinnate fashion either in one plane or twisted into a spiral. Female gonophores present, with unbranched spadix. Gonophore-bearing hydranths with reduced tentacles.

The second sample (SCD 37R) includes portions of a colony with a more bushy and stiff appearance and with both main stem and principle branches fascicled. Female gonophores present, with unbranched spadix.

Nematocysts (from AFR 0002E)

(i) Small heteronemes, 7·2 × 2·7 μ, present on both body and tentacles.

(ii) Large isorhizas, 18·0–18·9 × 7·2–7·6 μ present on body only.

Remarks. The first of these specimens agrees well with published descriptions of *E. ramosum* and there can be little doubt as to the identification. The appear-

ance and measurements of the two categories of nematocyst in the undischarged state are also close enough to those given for the species by Weill (1934), the small heteronemes probably being microbasic euryteles.

The identification of the second specimen is more doubtful due to the different appearance of the colony and the fact that the hydranths were too poorly preserved for nematocyst examination.

This is the first record of the species from South Africa.

Family **Hydractiniidae**

Hydractinia altispina Millard, 1955

Hydractinia altispina Millard, 1955: 215, fig. 1. Millard, 1957: 179.

Records. West coast: B 62, 92 (reported by Millard, 1955). LAM 50W, 59C. LU 59Z. SAMH 407. SB 153T.

Hydractinia kaffraria Millard, 1955

Fig. 6

Hydractinia kaffraria Millard, 1955: 217, fig. 2. Millard, 1959*a*: 307.

Records. South coast: BMR 23L. BRE 111A. HAM 3Q. KNY 30P, 70E, 164, 270J. SUN 3N. (All reported by Millard, 1955.)

Remarks on living material. Specimens from Knysna Estuary were kept alive on their host snails for a period of two weeks in the laboratory in January, 1956, when the release of the sexual products from mature sporosacs was observed.

The ripe male and female sporosacs have the structure of degenerate medusae, with radial and circular canals and rudimentary marginal tentacles, but the sexual products are discharged while still attached to the gonozooids and there is no active medusoid generation.

The male sporosacs when mature are practically spherical and measure approximately 0·65 mm. in length and 0·63 mm. in diameter. The four radial canals are distinctly visible and around the opening are 4–6 rudimentary but distinct marginal tentacles. The cavity is filled with spermatogenic cells attached to the central spadix. While still attached to the gonozooid irregular powerful contractions of the whole bell expel the active spermatozoa through the aperture. A cloud of massed spermatozoa surrounds the sporosac for some time until finally dispersed by the movements of the hydroids and their host. Once the sporosacs are empty they fall off and lie loose on the bottom, but show no further activity. At this stage they are more oval than spherical, the length being greater than the diameter.

The mature female sporosacs are larger than the male, measuring approximately 0·90 mm. in length and 0·86 mm. in diameter. Radial canals are visible but the marginal tentacles are very indistinct and not so well developed as in the male. The ripe eggs separate from the spadix and lie loose the cavity of the bell. Fertilization apparently occurs inside the bell, since eggs contain either one or two nuclei immediately after discharge. The area

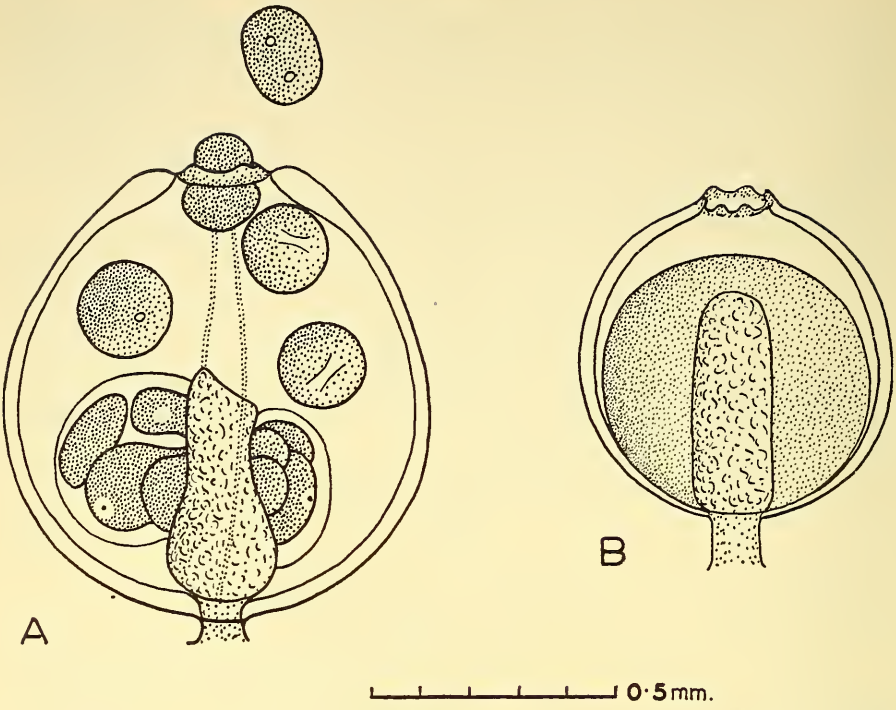

Fig. 6. *Hydractinia kaffraria* Millard.

A. A female sporosac in the process of releasing eggs.
B. A male sporosac.

(Both from living material.)

around the aperture of the sporosac performs irregular contractions which constrict the opening, but no complete contractions of the bell have been observed. These may possibly occur sporadically in the natural condition. Under the microscope the pressure of the coverslip is sufficient to squeeze out the eggs one by one, and the final fillip is provided by the contraction of the margin. The diameter of the eggs is greater than that of the aperture, but their elasticity allows them to be ejected with ease. Occasionally the sporosacs fall off the gonozooids before all the eggs are discharged and continue to perform gentle contractions of the margin, though no swimming movements have been observed.

Hydrocorella africana Stechow, 1921

Fig. 7

Hydrocorella africana Stechow, 1925*b*: 409. Millard, 1957: 183.

Records. West coast: A 405. AFR 801Q. CP 646B. HB 4D. SAMH 408. WCD 12J, 25C. South coast: AFR 866R, 967.O.V, 985E, 994M. SCD 114Q, 133B, 175U, 206R. TRA 33.00.D, 42K, 56C, 99E.

Description. Common on shells of gastropods and hermits. Has been observed on *Turbo sarmaticus* Linn., *Argobuccinum argus* (Gmelin), *Fusus verruculatus* Lam., *Nassa speciosa* A. Adams, and on shells occupied by the hermits *Clibanarius* sp., *Pagurus arrosor* (Herbst), *Diogenes costatus* Hend. and *Eupagurus placens* Stebb.

Skeleton as described by Stechow (1925*b*) with two grades of calcareous ridged processes; the larger 5 mm. or more in height and covered with naked coenosarc bearing gastrozooids and gonozooids; the smaller about 0·5–1 mm. in height, scattered amongst the hydranths. Young colonies with smaller processes only.

Living gastrozooids reaching 3 mm. in length when extended, with 5–12 extensile tentacles, of which 1 or 2 are usually much longer than the others.

Gonozooids reduced, reaching about 0·5 mm. in length in living material, with about 6 rudimentary, knob-like tentacles, and each bearing 3 or 4 spherical sporosacs in various stages of development. Male and female sporosacs on separate colonies. Male sporosacs bearing the spermatogenic cells around a central, hollow spadix, reaching 0·33 mm. in length and 0·33 mm. in maximum diameter. Female sporosacs containing a single central egg surrounded by a number of blind, hollow outgrowths from the basal spadix, reaching 0·36 mm. in length and 0·56 mm. in maximum diameter. Developing gonozooid often enclosed by curved laminar outgrowths of the skeleton, which form a sort of basket-work imprisoning it.

Colour: skeleton and spines white, hydranths creamy white, female sporosacs orange.

Nematocysts of two kinds: microbasic euryteles, 0·72 × 0·27 μ, and desmonemes, 0·45 × 0·27 μ.

Details of female sporosacs. Sections were cut to elucidate the rather unusual structure of the female reproductive bodies.

Female gonozooids are normal in structure with the exception of the tentacles which are reduced to knobs. In each gonozooid a number of young ova are present in the endoderm of the central region of the body. The youngest sporosac is nothing more than a bulge in the ectoderm into which one of the enlarging ova has been pushed together with a few endoderm cells. In one case such a bulge contains two ova, one large and one small. At a slightly later stage the sporosac is well-defined and contains a single large ovum seated on a low evagination of the gonozooid endoderm, which presumably represents a reduced spadix. A few endoderm cells are flattened against the periphery of the egg. There is no entocodon development and the ectoderm is single-layered.

After this the ovum enlarges enormously and becomes packed with yolky material. At the same time from the basal spadix several (usually 4) hollow, finger-shaped processes grow out around the ovum until they partially surround it. These may represent radial canals, but they do not communicate distally and there is no sign of a circular canal or any other medusoid structure. This is the oldest stage seen in sections, but presumably fertilization occurs *in situ*,

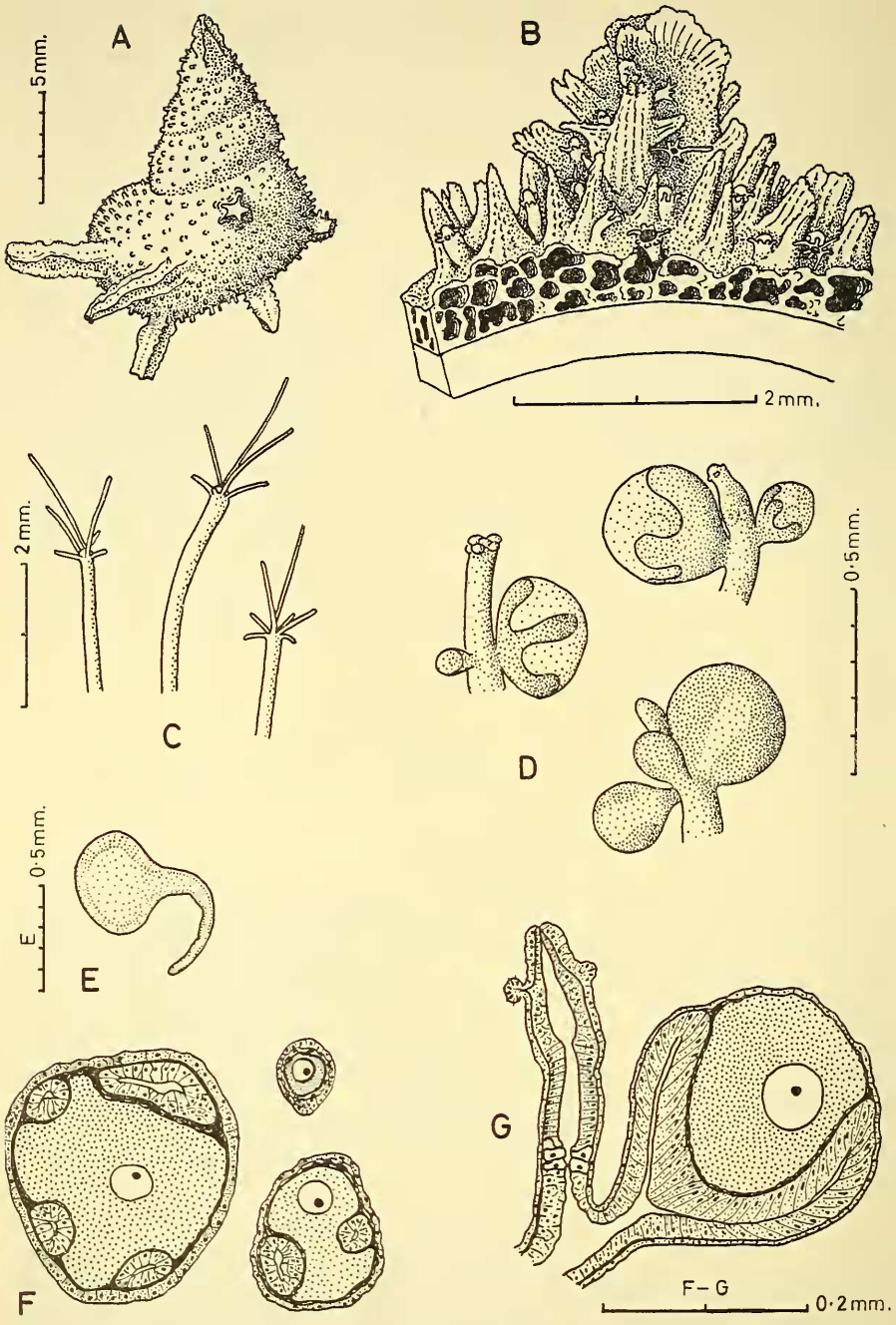

Fig. 7. *Hydrocorella africana* Stechow.

A. A colony growing on a shell occupied by a hermit.
B. A section through colony and shell on a larger scale, showing many small processes, one large one, and contracted hydranths.
C. Expanded gastrozooids sketched from a living colony.
D. Gonozooids bearing sporosacs, two female and one male.
E. Planula larva after release.
F. ts. 3 female sporosacs at different stages.
G. l.s. female gonozooid and sporosac. Young eggs visible in endoderm of gonozooid.

for on several occasions gourd-shaped planulae have been found imprisoned by the over-arching extensions of the skeleton.

Remarks. This species was described by Stechow (1925*b*) with particular emphasis on the skeleton, but it has never been illustrated. Stechow mentioned male sporosacs only and failed to observe the gonozooids.

Podocoryne carnea M. Sars, 1846

Podocoryne inermis Allman, 1876: 255, pl. 10 (figs. 4–5).
Hydractinia carnea: Vervoort, 1946*b*: 126, fig. 49. Millard, 1957: 181.

Records. West coast: LB 380C, 403C. SB 132N, 174M, 231Y, 267V, 269B. TB 13, 14, 15, 21K. WCD 134C. South coast: KNY 212G. LIZ 3B, 24X. MB 25D. SCD 26E, 111C, 113E, 126L, 239G, 258S, 281E, 330F, 333F. All on shells of the gastropod *Nassa* (*Hinia*) *speciosa* A. Adams.

Remarks. One of these colonies (SCD 26E) is without spines and would correspond to the spineless form found in Europe ('*Podocoryne inermis*' of Allman).

Family **Pandeidae**

Leuckartiara octona (Fleming, 1823)

Leuckartiara octona: Rees, 1938: 12, figs. 3–5. Millard, 1957: 182.

Records. South coast: LIZ 3A. SCD 20J, 26D, 94B, 258T, 281F, 314C, 333G.

Remarks. To avoid misidentification, only those specimens with medusa buds are included in the above records. SCD 281F was growing on the shell of *Nassa speciosa* A. Adams, SCD 314C on *Nassa analogica* Sow. and all others on *Bullia annulata* (Lam.).

Family **Aequoreidae**

Aequorea africana n. sp.
Fig. 8

Holotype: MB 70G from Mossel Bay on the south coast. South African Museum catalogue number: SAMH 413.

Description. A colony with well-extended hydranths growing on an empty snail-shell.

Stem unbranched or branching sympodially up to three times, reaching a maximum height of 0·2 cm. Stem and branches annulated or corrugated, increasing in diameter from base to distal end, bearing terminal hydrothecae. Shorter stems closely and distinctly annulated throughout, longer ones closely annulated in basal region, irregularly corrugated in more distal part.

Hydrotheca thin and membranous except for base which is somewhat stouter and remains as a saucer-shaped *Halecium*-like structure in damaged or regenerated specimens (fig. 8A), with distal region irregularly creased and folded longitudinally to form an operculum below which the hydranth can be

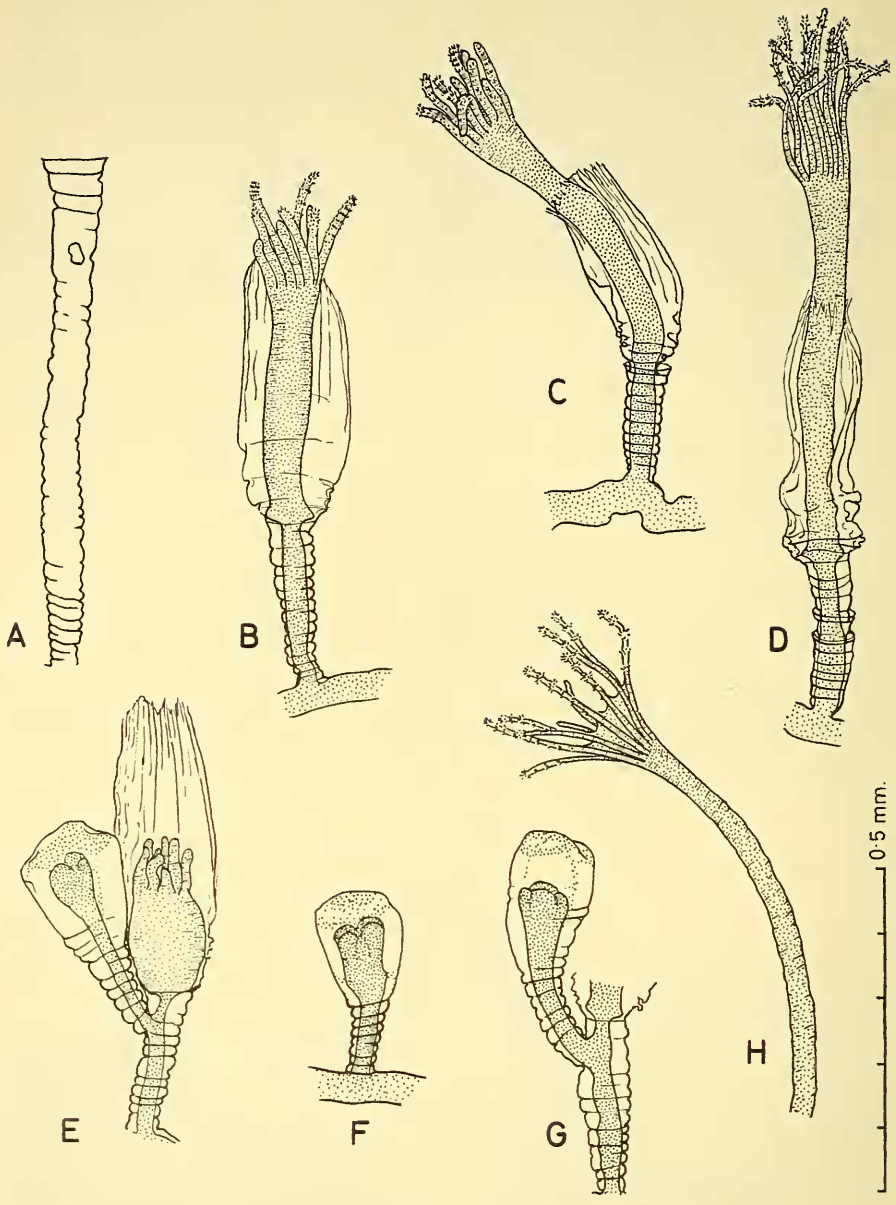

FIG. 8. *Aequorea africana* n. sp.

A. An empty stem surmounted by a saucer-shaped structure (the remains of the hydrotheca).
B–E. Hydrothecae containing hydranths in various stages of expansion, E with a gonotheca.
F and G. Gonothecae containing medusa buds, F arising from hydrorhiza, G from the stem.
H. An expanded hydranth showing the web between the tentacle-bases.

withdrawn. Hydranth long and extensile, with conical hypostome and 11–17 tentacles united by a web at their bases (fig. 8H). Tentacles often moniliform in appearance.

Gonophores borne on stem or hydrorhiza, each on an annulated pedicel which increases in diameter towards the distal end. Gonotheca not sharply demarcated from pedicel, pear-shaped, containing one young medusa-bud.

Measurements (mm.)

Stem, length	0·18–2·05
maximum diameter	0·045–0·07
Hydrotheca, length	0·32–0·55
maximum diameter	0·11.0·18
Hydranth, length to hypostome (preserved)	reaching 0·72
Gonotheca, length, with pedicel	0·29–0·40
maximum diameter	0·12–0·15

Remarks. This species is closely related to several members of the 'Campanulinid' group of hydroids, in particular to the following:

(i) *Campomma hincksi* (Hartlaub, 1897). This species was linked by Hartlaub with the medusa *Eucheilota maculata* Hartlaub, 1894, probably erroneously according to Rees (1939, p. 442) and Russell (1953, p. 313). *Campomma hincksi* is the sole representative of its genus, which is retained provisionally only until such time as the medusa can be definitely placed. Both *C. hincksi* and *E. maculata* are known only from Europe. *Aequorea africana* strongly resembles Leloup's material of *C. hincksi* from Belgium (1952, fig. 70).

(ii) *Campanulina paracuminata* Rees, 1938. This is almost certainly the hydroid of *Aequorea aequorea* (Forskål, 1775) (= *Aequorea forskalea* Péron and Lesueur, 1809; see Russell, 1953, p. 350, and Huvé, 1952, p. 36). The medusa is known from Atlantic coasts including South Africa (Kramp, 1961).

(iii) *Campanulina acuminata* (Alder, 1857). This is probably the hydroid of *Aequorea vitrina* Gosse, 1853 (see Russell, 1953, p. 354) or of *Aequorea pensilis* (Haeckel, 1879) (see Huvé, 1952, p. 37). *A. vitrina* occurs in N.W. Europe and *A. pensilis* in the English Channel and in the Pacific and Indian Oceans including South Africa (Kramp, 1961).

The present material may well be *Campanulina paracuminata*, whose medusa is known from South Africa and material of which was examined in the British Museum in 1960; but as there are slight structural differences (e.g. in the nature of the operculum and the number of tentacles) and as there are other South African species of *Aequorea* with unknown hydroids (e.g. *A. coerulescens* (Brandt, 1838) and *A. macrodactyla* (Brandt, 1838)), a separate species has been established as a temporary measure.

Family **Lovenellidae**

Lovenella chiquitita Millard, 1957

Lovenella chiquitita Millard, 1957: 198, fig. 7. Millard, 1959*b*: 250, fig. 3.

Records. West coast: A 384D. SWD 39G. TRA 156C.

Remarks. The placing of this species in the genus *Lovenella* is a temporary measure only and is based on the morphology of the hydroid generation, which shows close affinity to *Lovenella clausa* (Lovén, 1836).

The medusa, in its absence of cirri at the time of liberation, is more closely related to *Phialella.* That it is not *P. quadrata* (Forbes, 1848) was established by comparison with material of the hydroid generation of the latter in the British Museum in 1960, for which privilege the author is indebted to Dr. W. J. Rees. It might well be *P. falklandica* Browne, 1902, the medusa of which has been found in South Africa at Saldanha Bay (identification by Dr. M. E. Thiel, Zoologisches Museum, Hamburg), yet the youngest known medusae of this species (0·8–1·0 mm. diameter) have 'four perradial tentacles, and the four interradial tentacles are just beginning to develop and are visible as four minute bulbs' (Brown and Kramp, 1939: 298), suggesting that they are liberated with only 4 tentacles and not 8 as in the present species.

Family **Haleciidae**

Halecium beanii (Johnston, 1838)

Fig. 9 A–F

Halecium beanii: Hincks, 1868: 224, pl. 43 (fig. 2). Broch, 1918: 38, fig. 13. Millard, 1957: 188. Millard, 1958: 168. Ralph, 1958: 332, fig. 10 *a*, *b*, *e–k*. Vervoort, 1959: 224, fig. 6.

Records. West coast: CP 336C. SB 196M. SWD 12D, 42F. TB 17A, 21B. WCD 125U, 145V. South coast: CPR 46L. LIZ 7S. MB 47T, 60Q. SAMH 157, 214, 273, 328, 335, 341. SCD 37M, 85M, 154C, 387G, 394B.

Description. Stiff, shrubby colonies, many of them epizootic on other hydroids, the largest reaching a height of 7·4 cm.

Remarks. Since no criterion can be found for distinguishing between sterile colonies of *H. beanii* and *H. halecinum*, only samples containing female gonophores have been included above. The species is certainly more common than is indicated by the records, as a further 26 sterile samples are present in the collection, all, or most of which, probably belong to the same species.

Attempts have been made by various authors to distinguish *H. beanii* from *H. halecinum* on the basis of the angle of the hydrothecal margin and the shape of the basal part of the hydrophore, but, as the accompanying diagrams (fig. 9 A–E, all chosen from fertile specimens) will show, both characters are so variable that no reliability can be placed upon them.

Halecium delicatulum Coughtrey, 1876

Fig. 10L

Halecium parvulum: Millard, 1957: 189, fig. 4A. Vervoort, 1959: 227, fig. 7.
Halecium parvulum, var. *magnum* Millard, 1957: 190, fig. 4 B–O.
Halecium delicatulum: Ralph, 1958: 334 (synonymy), figs. 11*e*, *h–n*, 12 *a–p*.

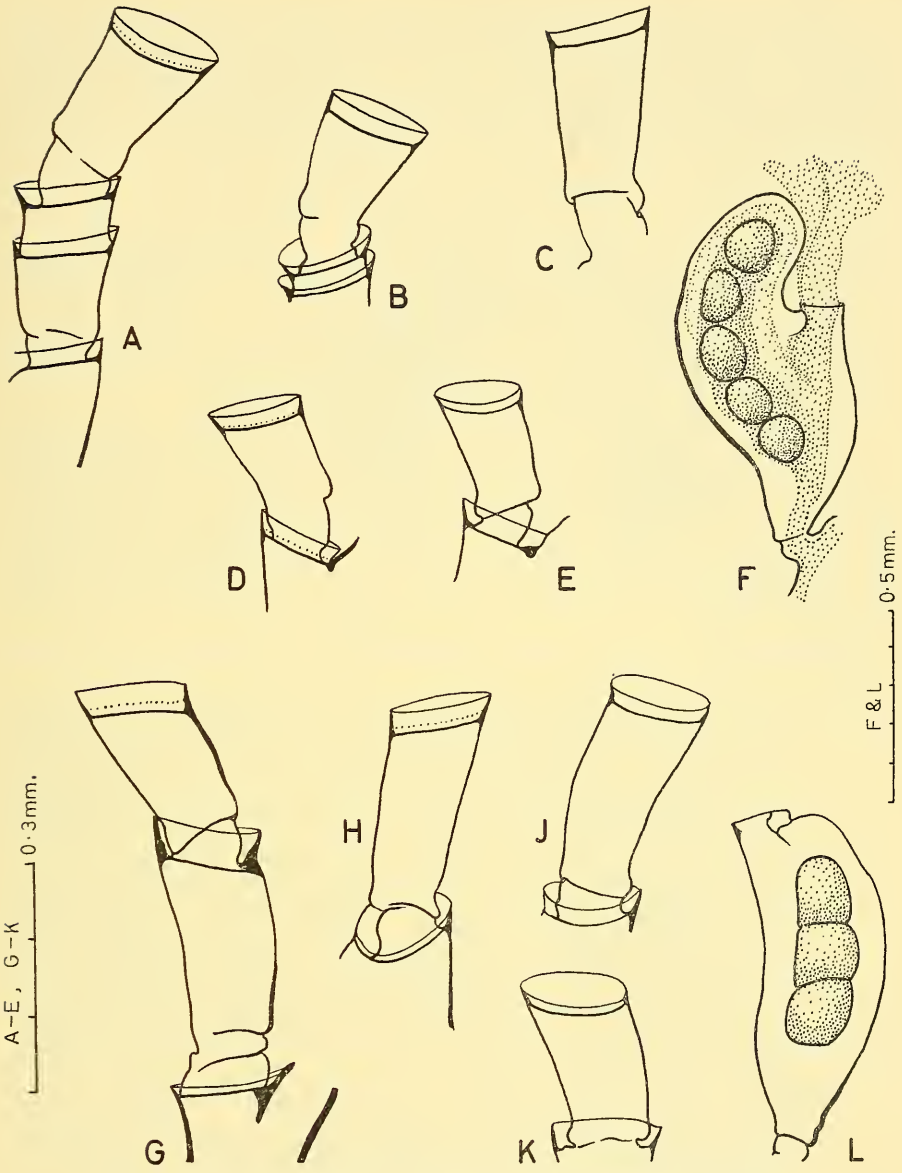

Fig. 9. *Halecium beanii* (Johnston) (A–F), and *H. halecinum* (Linn.) (G–L).
A–E and G–K, hydrophores from various colonies.
F and L, gonothecae.

Records. West coast: AFR 736Z. CP 327C. LAM 30P, 35A. TB 9, 17C, 21C. WCD 18T, 156A, 160P. South coast: LIZ 16F. MB 19Q, 84E, 88J. SAMH 179, 189, 242, 250, 381. SCD 5F, 22A, 29H, 37N, 52J, 85K, 154B, 179H. TRA 92M.

Remarks. It has been pointed out by Ralph (1958) that the large variety (var. *magnum* Millard) described in 1957 has similar dimensions to the type material of *H. flexile* Allman, 1888, which is now recognized as a synonym for *H. parvulum* and *H. delicatulum.* Since so great a variation of size is possible it is not justifiable to retain a subspecies on this character alone.

Halecium dichotomum Allman, 1888.
Fig. 10 A–K

Halecium dichotomum Allman, 1888: 13, pl. 6. Billard, 1910: 4. Stechow, 1925*b*: 419. Millard, 1957: 188 (excluding the male gonophores).

Records. West coast: WCD 20G, 164C. South coast: LIZ 7W. MB 8V, 12W. SAMH 162, 227, 243, 274, 352. SCD 5G, 29J, 37P, 81P, 85N, 154D, 175T, 188S, 239F, 265G, 333C, 387F, 394A. TRA 38J, 92N.

Description. Colonies very variable in appearance and growth-form. Stem fascicled, branching with the typical dichotomy described by Allman and generally in all planes, usually geniculate, with a tendency for annulation in the region of the nodes. Primary hydrophores usually sessile, secondary hydrophores usually symmetrical and annulated in the basal region. Hydrotheca low and wide, with walls flared outwards, over 0·17 mm. in diameter at the margin.

Among the variety of colonies examined two extremes of growth-form occur:

(i) Large upright colonies reaching 11–12 cm. in height, with strongly fascicled stems and branching mainly in one plane. Main stem more or less straight and dichotomy not obvious. Larger stems and branches stiff in appearance and up to 2 mm. thick, though unable to support themselves out of fluid. Smaller branches graceful and flexuous. Stem and branches with long internodes with no annulation other than a shallow constriction near the base. Secondary hydrophores scarce. Closer examination shows that the typical dichotomy is in fact present in this form, but that one limb is always short (the branch) and the other long, contributing to the axis of the stem. The latter limb is enveloped by peripheral tubes in fascicled regions, so obscuring the dichotomy (fig. 10 A, B).

(ii) Low, scrubby colonies, often epizootic, reaching a height of 1–2 cm. Stem usually weakly fascicled and strongly geniculate. Branching profuse and in all planes, and stolonisation common, resulting in a tangled mat which may cover large areas of the substratum and is very easily recognised. The typical dichotomy is common in this form and very obvious (fig. 10 C). The internodes of the stem and branches tend to be shorter and more annulated, and secondary hydrophores are abundant and often closely annulated in their basal regions.

In two specimens (MB 12W and WCD 164C) of the low, scrubby form, the colony is epizootic on a dead polyzoan and the hydrorhiza is provided with

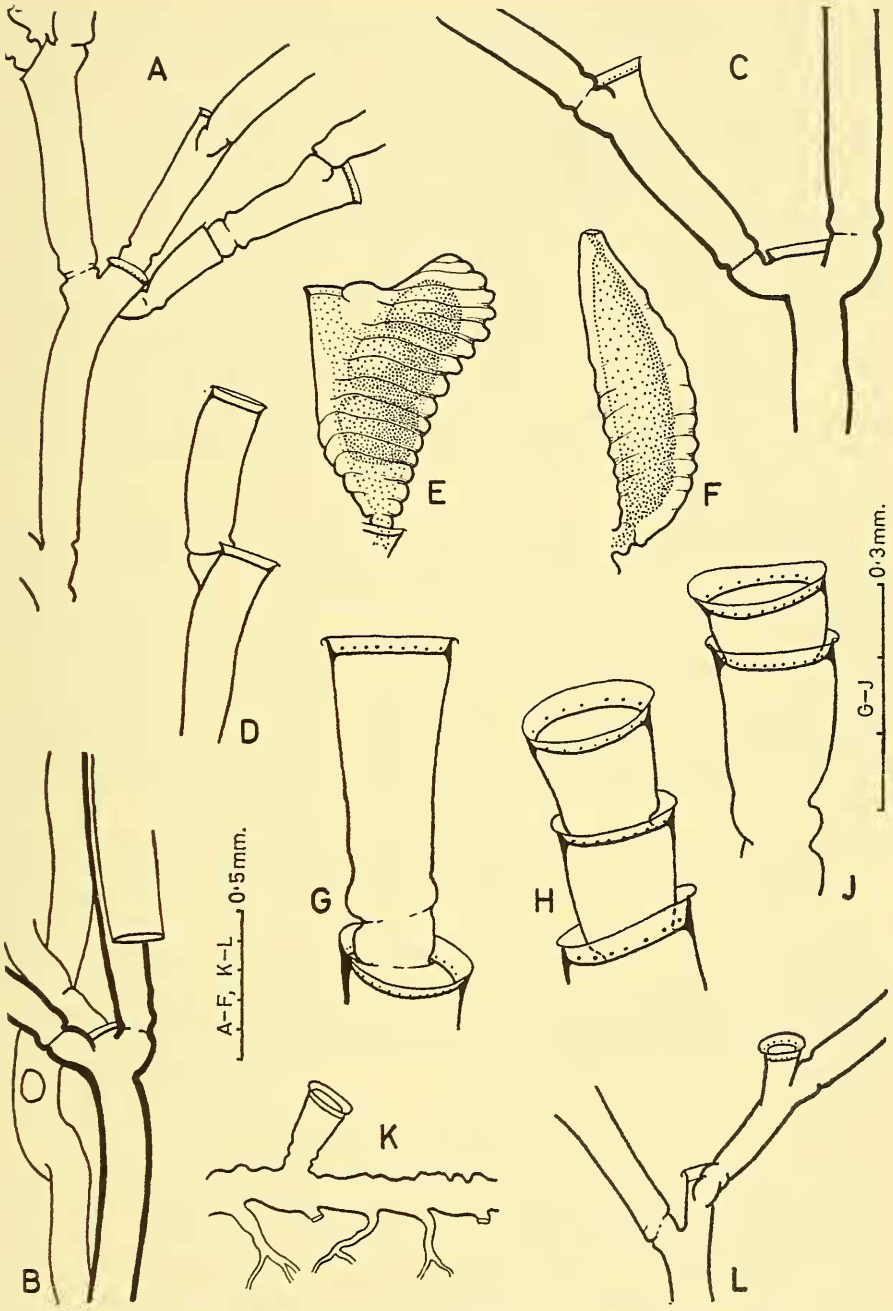

FIG. 10. *Halecium dichotomum* Allman (A–K) and *H. delicatulum* Coughtrey (L).

A and B. Portions of stem from the distal and proximal ends respectively of the tall form, to show the incorporation of one limb of the dichotomy into a main stem. Peripheral tubes teased apart in B. (TRA 92N.)

C and D. Portions of stem from TRA 38J, showing typical dichotomy in C and a unilateral branch in D.

E and F. Female and male gonophores.

G–J. Details of secondary hydrophores.

K. Part of the hydrorhiza to show root-like structures (MB 12W).

L. Part of a branching stem in *H. delicatulum* for comparison.

unusual rootlike projections which enter the pores of the host and anchor the colony (fig. 10 K). Similar 'roots' have been observed on other mounted specimens.

Female gonophores as described by Allman. Male gonophores on separate colonies, slender, elongated and often curved, tapering distally to a small rounded aperture, closely annulated throughout or smooth in distal region (fig. 10 F). Reaching 1·24 mm. in height and 0·36 mm. in maximum diameter.

Remarks. The variation in the growth-form of this species is remarkable, and at first glance the two extremes might be taken for different species. However, female gonophores have been found in both, and intermediate types exist. Comparison with Allman's type material in the British Museum (slide no. 88.11.13.9) confirms the identification, and shows that the hydrophores are similarly variable. Primary hydrophores, though usually sessile, may be quite long. The hydrotheca may be strongly flared out, weakly flared at the extreme distal edge only (the commonest type), or the everted part may be quite worn off.

This variation may introduce difficulties in the identification of sterile colonies and possible confusion with species such as *H. delicatulum*, though to one familiar with the species no difficulty arises. Useful diagnostic characters are the normally sessile primary hydrophores, the typical dichotomy in which 2 or even 3 internodes arise from a previous one at the same level, and the characteristic curved apophysis by which each internode arises from its predecessor. Dichotomy may also occur in *H. delicatulum*, but the two limbs usually arise at different levels and the apophyses are not curved (fig. 10 L). *H. dichotomum* may be distinguished from *H. tenellum* by its fascicled stem and larger hydrothecae.

With the abundant material available, it was possible to clear up the confusion which previously existed over the nature of the male gonophores of this species. A re-examination of the material described from False Bay (Millard, 1957: 188) showed that the smooth gonophores from sample FAL 78Z belonged in fact to an epizootic male colony of *H. beanii* inextricably tangled with a female colony of *H. dichotomum*. The annulated gonophores without lateral openings from sample FAL 64N and thought to be female, were in fact male.

Halecium halecinum (Linn., 1758)
Fig. 9 G–L

Halecium halecinum: Hincks, 1868: 221, pl. 42. Broch, 1918: 36, fig. 11. Vervoort, 1946*b*: 158, figs. 63–64. Vervoort, 1959: 225.

Records. South coast: SCD 85P.

Description. A small epizootic, yet fertile, colony, reaching a maximum height of 0·6 cm. Stems stunted and branching irregularly, but fascicled at base. Internode length about twice width at distal end.

Secondary hydrophores very variable, most are asymmetrical, curving

towards abcauline side and with an obliquely set aperture. Some are quite symmetrical in the basal region, though asymmetrical more distally. In only a few is the aperture perpendicular to the axis.

Female gonothecae banana-shaped with concave adcauline side and terminal aperture. Containing a single row of 3–4 large eggs.

Remarks. This species is possibly more abundant than is indicated by this single record, as without gonophores it is impossible to distinguish from *H. beanii*. This is the only fertile colony observed and the first fertile, and therefore unquestionable, record from South Africa.

Halecium ?muricatum (Ell. & Sol., 1786)
Fig. 11 A, B

Halecium muricatum: Hincks, 1868: 223, pl. 13 (fig. 1). Broch, 1918: 43, fig. 17. Vervoort, 1946*b*: 163, fig. 67.

Records. West coast: TB 19A. South coast: SCD 56U.

Description. Fascicled stems reaching a maximum height of 4·7 cm., branching in an irregularly pinnate fashion, straight for most of length though sometimes weakly geniculate in distal regions, fairly rigid and able to support themselves out of fluid, though more graceful in appearance than in *H. beanii*. Nodes oblique and sloping alternately to left and right.

Primary hydrophore long; borne on broad apophysis at distal end of each internode, from which it is separated by a distinct groove; usually asymmetrical with adcauline side more convex than abcauline; with a well-marked pseudodiaphragm in distal region below hydrotheca and usually a second one in proximal region. Pseudodiaphragm better developed on adcauline side. Secondary hydrophores similar, though not so long and usually with only one pseudodiaphragm. Hydrotheca relatively deep, margin everted, more so on adcauline side.

Gonophores absent.

Measurements (mm.)

	TB 19A	SCD 56U
Stem, internode length	0·70–0·86	0·61–0·77
diameter across node	0·19–0·24	0·12–0·28
Hydrotheca, diameter at margin	0·24–0·31	0·24–0·29
depth (diaphragm to margin)	0·09–0·14	0·08–0·12

Remarks. The identification of this species must remain dubious until the gonophores have been discovered. The stem and hydrophores are remarkably similar to those illustrated by Broch (1918) for *H. muricatum*, yet *H. muricatum* is an arctic species and has not been reported from the Southern Hemisphere.

Another closely related species is *H. filicula* Allman, 1877, from the Gulf Stream and N. Atlantic Ocean. This species has smaller dimensions (cf. Billard, 1906: 163) and differs in the presence of 2 annulations at the base of the hydrophore and in the absence of a pseudodiaphragm. The gonothecae

(Billard, 1906, fig. 2) appear to be similar to those of *H. muricatum*, and the two species may prove to be conspecific.

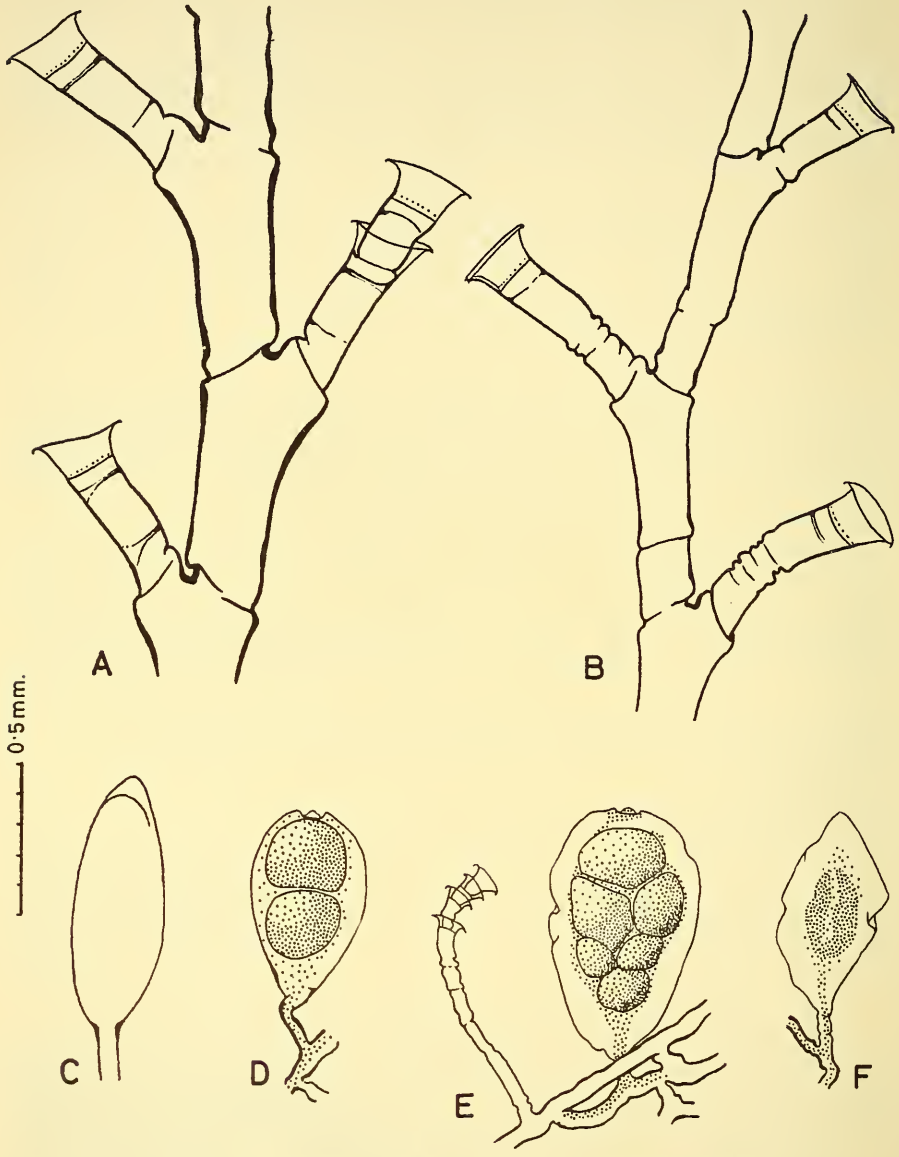

FIG. 11. *Halecium ?muricatum* (Ell. & Sol.) (A–B) and *H. tenellum* Hincks (C–F).

A and B. Portions of stem from TB 19A and SCD 56U respectively.
C and D. Female gonothecae in side and front views respectively, D with 2 larvae (SCD 37Q).
E. Part of colony and female gonotheca with several larvae (SCD 60B).
F. Male gonotheca from SAMH 315.

Halecium tenellum Hincks, 1861
Fig. 11 C–F

Halecium tenellum: Millard, 1957: 193, fig. 5. Hamond, 1957: 307, fig. 14. Ralph, 1958: 340. Vervoort, 1959: 229, fig. 8. Naumov, 1960: 454, fig. 344.

Records. South coast: MB 8X. SAMH 315. SCD 37Q, 60B, 394C.

Description. A number of colonies, mostly epizootic, with unfascicled stems reaching a maximum height of 0·4 cm. Stems geniculate and often branching in a dichotomous manner, usually with many athecate internodes as previously figured (Millard, 1957), but often of more normal appearance as figured by Vervoort (1959) and Hamond (1957).

Male and female gonophores present, on separate colonies. Male gonothecae compressed, broad and bluntly rounded at distal end when young, pointed at distal end when mature, reaching a maximum of 1·07 mm. in length and 0·60 mm. in diameter. Female gonothecae borne on stem or hydrorhiza, compressed, pear-shaped in anterior view with bluntly rounded distal end, and a circular, terminal aperture blocked by a small papilla which is shed on the escape of the contents, reaching a maximum of 1·07 mm. in length, 0·51 mm. in diameter and 0·30 mm. in thickness; with no hydranths; containing 2–7 eggs on a branching blastostyle, which develop into planulae *in situ*.

Remarks. Vervoort was correct in assuming that the male gonophores previously described (Millard, 1957) were young ones, as larger mature ones in the process of shedding their contents have now come to light.

Family **Campanulariidae**

Campanularia hincksii Alder, 1856
Fig. 12 A–D

Campanularia Hincksii Alder, 1856: 360, pl. 13 (fig. 9). Hincks, 1868: 162, pl. 24 (fig. 3), fig. 18 Billard, 1906: 172, figs. 4–5 (incl. var. *grandis*).
Campanularia hincksii: Vervoort, 1959: 311, fig. 55*a*.

Records. South coast: SAMH 283. SCD 354G.

Description. Pedicels unbranched and smooth, except for occasional regeneration lines, with a single spherule at distal end.

Hydrotheca inverted cone-shaped, with 8–12 broad, marginal teeth in which the distal end is either hollowed out to form two points or (more rarely) truncated. Hydrotheca polygonal in end-on view, the angles between the teeth forming longitudinal striations visible in side view, which may continue to the base or peter out half-way down. Diaphragm in form of annular thecal thickening.

Female gonotheca with very short stalk, elongated, broad near base and narrowing slightly to truncated distal end, with about 8 low, rounded annulations. Only 2 gonothecae seen, one empty and one almost spent yet still containing 2 eggs.

Measurements (mm.)	SAMH 283	SCD 354G
Pedicel length	2·26–4·19	3·70–6·81
maximum diameter	0·08.0·13	0·12–0·15
Hydrotheca, length	0·85–1·24	1·20–1·55
maximum diameter	0·47–0·77	0·60–0·88
length/diameter	1·36–1·97	1·48–2·27
Gonotheca, length	1·52	
maximum diameter	0·64	

Remarks. This is the first record of the species from South Africa. The measurements correspond well with Billard's var. *grandis*, but the material resembles the typical form more in the double nature of the marginal teeth. These teeth appear to become truncated as they wear down with age.

Campanularia integra MacGillivray, 1842
Fig. 13 A–D

Campanularia caliculata: Warren, 1908: 338, fig. 19.
Campanularia integra: Billard, 1907: 340. Jäderholm, 1917: 4. Broch, 1918: 159 (synonymy). Millard, 1957: 193. Millard, 1958: 171.
Clytia compressa: Vanhöffen, 1910: 303, fig. 24.
?Campanularia gracilis: Stechow, 1925*b*: 423, fig. 6.
Orthopyxis caliculata: Ralph, 1957: 838, fig. 6 *a–f*.

Records. South coast: CPR 9E. LIZ 7U, 13C. MB 52L, 55J. SCD 84X, 179E.

Description. Colonies creeping on weeds and other hydroids, particularly *Lytocarpus filamentosus*.

Remarks. In the identification of this species I have followed Broch (1918) who considers *C. integra*, *C. caliculata* and *C. compressa* as synonymous, although this opinion is not accepted by all recent authors. The difference between these species is supposed to lie in the gonotheca, which is said to be spirally annulated in *C. integra*, smooth and round in section in *C. caliculata*, and smooth and compressed in *C. compressa*. Broch claims to have found intergrading forms between *C. integra* and *C. caliculata*, while the South African material shows intergrading forms between *C. caliculata* and *C. compressa*. Here the gonotheca is usually compressed and smooth, but may also be round in section, and is sometimes roughly corrugated, though not distinctly annulated.

Medusa systematists distinguish the 'medusa' of *C. caliculata* (*Agastra mira* Hartlaub, 1897) from that of *C. compressa* (*Agastra rubra* Behner, 1914) on minor points such as the arrangement of eggs. Of the two, the South African material resembles more *Agastra rubra*, as the eggs are large and comparatively few in number.

Campanularia laminacarpa n.sp.
Fig. 12 E–K

?Campanularia tincta: Jäderholm, 1923: 6
?Campanularia africana: Stechow, 1925*b*: 420, 421 (material from Agulhas Bank, station 105).
Non Campanularia tincta: Warren, 1908: 337, fig. 18.
Non Campanularia africana Stechow, 1923*b*: 104.

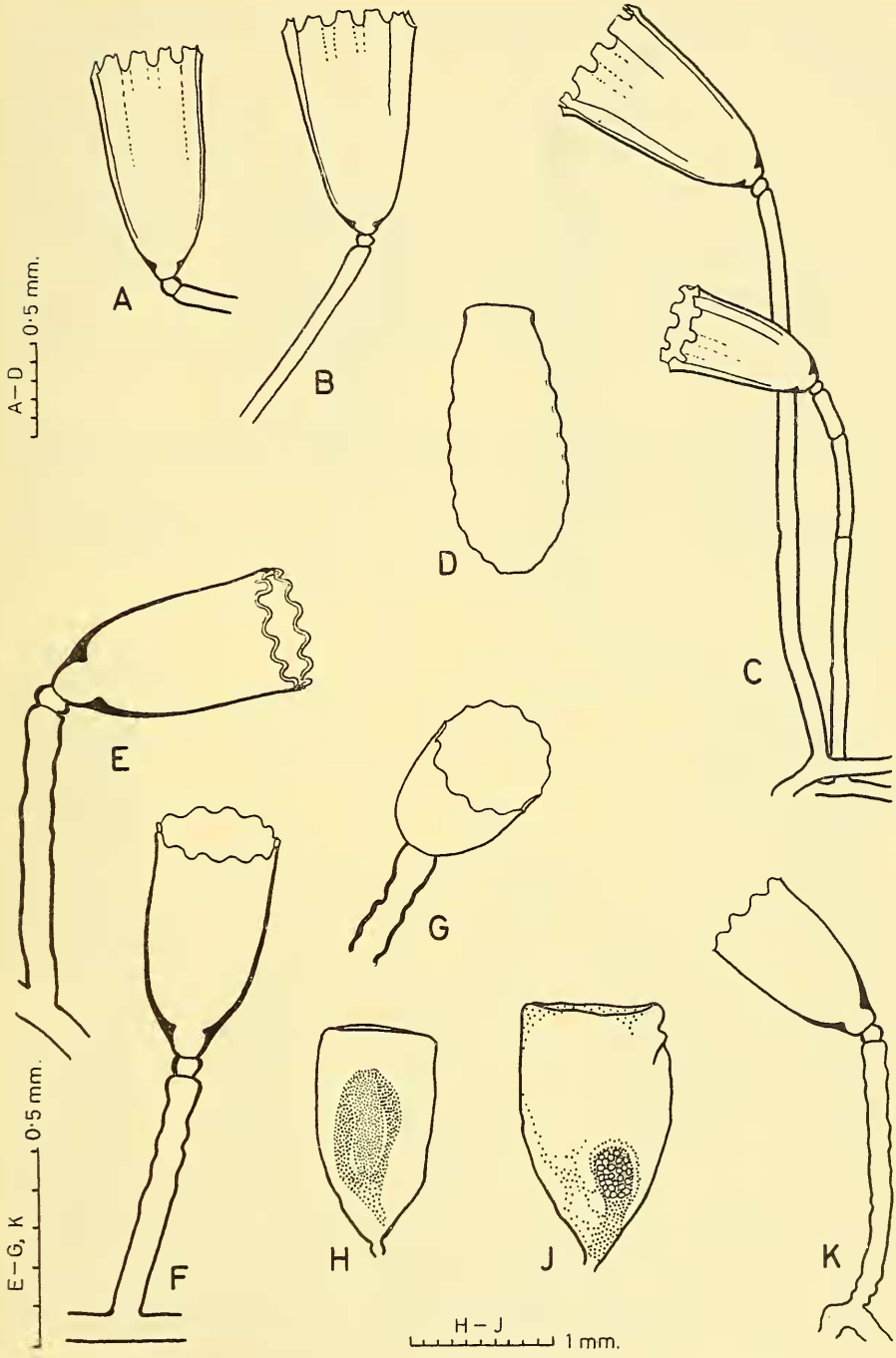

FIG. 12. *Campanularia hincksii* Alder (A–D) and *C. laminacarpa* n. sp. (E–K).

A–C, hydrothecae, and D, gonotheca, from SAMH 283.
E–G, hydrothecae from TRA 38P, and K, from SCD 84U.
H. Male gonophore from SCD 84U.
J. Female gonophore from the holotype, TRA 32A.

Holotype: TRA 32A, a female colony from the Agulhas Bank growing on *Thyroscyphus aequalis* Warren. South African Museum registered number: SAMH 414.

Other records: South coast: SAMH 174, 269, 351. SCD 37V, 61F, 79M, 84U, 112A, 117L, 154E, 169Y, 265E, 394F. TRA 35Z, 38P, 56U, 92B.

Description. Colony stolonic and epizootic on the Sertulariid *Thyroscyphus aequalis*. Hydrothecal pedicel upright, unbranched, smooth or corrugated, with a spherule of smaller diameter at the distal end.

Hydrotheca tubular or slightly expanding to margin, smooth, with length about twice diameter at margin, with a diaphragm in the form of a well-developed annular thickening of the perisarc, with 10–14 rounded marginal teeth.

Gonotheca erect, flat, smooth, generally held in a plane at right angles to the stem of the host, broadening to distal end which is abruptly truncated, with a wide, operculate aperture. Male and female similar. Female containing a single sporosac bearing numerous small eggs. Male with a single sporosac with the structure of a degenerate medusa, spermatogenic cells arranged in 4 longitudinal bands with indications of 4 radial canals.

Measurements (mm.)

Hydrothecal pedicel, length	0·31–1·34
maximum diameter	0·06–0·11
Hydrotheca, height	0·36–0·71
diameter at margin	0·225–0·34
diameter/height	0·46–0·74
Gonotheca, height	1·53–2·01
maximum diameter	0·81–1·20

Remarks. This species has previously been confused with *Campanularia africana* Stechow, 1923*b*. The discovery of gonothecae, which are larger and quite different in appearance from those of the latter species, necessitates the establishment of a new species. Unfortunately the two species have identical trophosomes and there is no method of distinguishing sterile material.

Campanularia africana was originally described from Park Rynie, Natal, as *C. tincta* by Warren in 1908 (p. 337, fig. 18). It has cylindrical to ovate gonothecae, narrowing towards the distal end and then everted to form a short, circular collar around the aperture. Although there are variations in shape the gonothecae are never flattened, but always round or nearly so in section. I have examined Warren's material, which was kindly loaned to me by the Director of the Natal Museum, and found his diagrams to be a faithful representation of the structure. The gonothecae contain a number of large planulae. It was to this material that Stechow (1923*b*) gave the new name of *Campanularia africana*. The species presumably also includes Pennycuik's material from Australia (1959: 169), which possessed male gonothecae, one with '5 shallow annulations'.

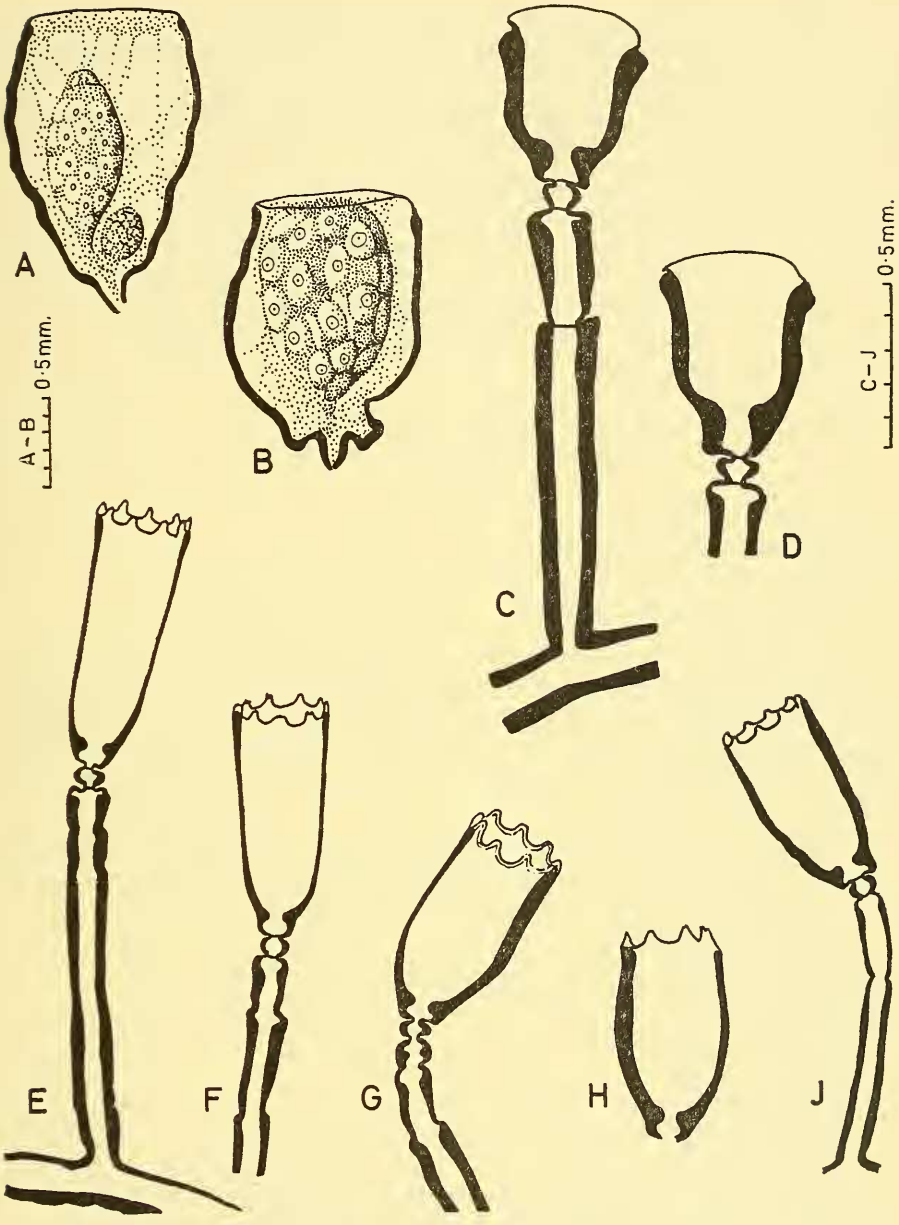

FIG. 13. *Campanularia integra* MacGill. (A–D) and *C. ?mollis* (Stechow) (E–J).
A and B, Gonothecae, and C and D, hydrothecae from CP 258.
E–J, various hydrothecae from CP 646C showing variation in thickness of walls.

Stechow (1925*b*) stated that he had examined material loaned to him by Warren. This was obviously not the type material, and was not recorded by Warren, for it came from Algoa Bay, and it was growing on *Thyroscyphus regularis* (= *T. aequalis*) and presumably unfertile. This material was probably *C. laminacarpa*, as was Stechow's Valdivia material (unfertile) reported in the same paper, at any rate that growing on *T. aequalis*. *C. laminacarpa* possibly only occurs on *T. aequalis* as I could only identify gonothecae in material growing on this host, and I have only quoted records (above) of material growing on *Thyroscyphus*. Of these, 7 have gonothecae of the flattened type.

Several other sterile colonies present in this collection, and growing on other species of hydroids, cannot be identified with certainty, nor can unfertile material in the literature.

Campanularia ?mollis (Stechow, 1919)
Fig. 13 E–J

Clytia mollis Stechow, 1919: 44, fig. L.
Campanularia mollis: Picard, 1951: 344, fig. 3.
Orthopyxis mollis: Ralph, 1957: 840, fig. 7*e–k*.

Records. West coast: CP 646C.

Description. A flourishing colony growing on weed. Pedicel generally smooth, with a single small spherule at distal end, often with regeneration nodes. Hydrotheca cylindrical, with length 2–3 times height, with 7–9 clearly defined marginal teeth separated by broad and shallow bays, diaphragm in form of annular thecal thickening. Marginal teeth sometimes bifurcated at the tip. Margin often reduplicated.

Perisarc of pedicels very thick, that of hydrothecae variable, sometimes thick throughout, sometimes thin for the most part though always thickened at margin and near base.

Gonothecae absent.

Measurements (mm., without reduplications).

Pedicel, length	0·58–1·87
maximum diameter	0·10–0·17
Hydrotheca, length	0·57–0·80
diameter at margin	0·26–0·33
length/diameter	1·94–2·93

Remarks. The identification of this species must remain doubtful in the absence of gonothecae, as there are several closely related species with similar trophosomes. It is close to *C. mollis* though differing from previous descriptions of the species in the larger hydrothecae, better defined marginal teeth and smooth pedicels. A few specimens do, however, show indications of a spiral twisting at the base of the pedicel. The species has not been recorded from South Africa before.

Campanularia morgansi Millard, 1957

Campanularia morgansi Millard, 1957: 195, fig. 6. Millard, 1958: 171.

Records. South coast: LAM 30M. MB 47Y. SAMH 202, 221, 230, 296. SCD 37W, 84W, 117K, 354F. West coast: WCD 12H.

Genus *Clytia* Lamouroux, 1812

Remarks on type species. The genus *Clytia* was established by Lamouroux in 1812 (p. 184) for 3 species, namely:

Sertularia volubilis
Sertularia syringa Linn., 1767
Sertularia verticillata Linn., 1758

Of these, *S. syringa* has been transferred to *Calicella* Hincks, 1859, and *S. verticillata* is generally considered as a species of *Campanularia* but has recently been declared the type species of a new genus *Verticillina* by Naumov (1960).

In the literature 2 species have been confused under the specific name of *volubilis*:

(i) The name *Sertularia volubilis* was originally established by Linnaeus in 1758 (p. 811) for Ellis's 'small climbing Coralline with bell-shaped cups' described and figured by the latter in 1755 (p. 24, pl. 14, fig. *a*, A). But Ellis's description was very inadequate and the material might be either *Campanularia* or *Clytia*. However, the name has been retained for a well-known species of *Campanularia* with fixed sporosacs and a smooth gonotheca which has been declared by Naumov in 1960 to be the type species of this genus (i.e. *Campanularia volubilis* (Linn., 1758)).

(ii) In 1786 Ellis and Solander (p. 51, pl. 4, fig. *e*, *f*, E, F) described and figured under the name of *Sertularia volubilis* material with an annulated gonotheca which is unmistakably recognisable as the species later described by Alder in 1856 as *Campanularia johnstoni*. Ellis and Solander added the corollary that 'there are different varieties and sizes of this twining bell-shaped Coralline'. It is to this description that Lamouroux referred when he created the genus *Clytia*.

So far as I can determine no type species has been established for the genus *Clytia* and I therefore select *Sertularia volubilis* Ellis & Solander, 1786, *non Sertularia volubilis* Linn., 1758.

However, the specific name *volubilis* is obviously untenable. The name *johnstoni* Alder, 1856, is antedated by the name of the medusa of the same species, namely *Medusa hemisphaerica* bestowed by Linnaeus in 1767 on the '*Medusa hemisphaerica*' of Gronovius, 1760 (the latter name being part of a Latin description and thus not valid). The same medusa was later placed in the genus *Phialidium* Leuckart, 1856, by which name it is now generally known, but which is antedated by *Clytia* Lamouroux, 1812.

To sum up, the name of the type species of the genus *Clytia* becomes *Clytia hemisphaerica* (Linn., 1767).

Synonyms: *Medusa hemisphaerica* Linn., 1767
Phialidium hemisphaericum (Linn., 1767)
Sertularia volubilis Ellis & Solander, 1786, *non* Linnaeus, 1758.
Campanularia johnstoni Alder, 1856

Clytia hemisphaerica (Linn., 1767)
Fig. 14 A–F

Laomedea gracilis: M. Sars, 1857: 160, pl. 2 (figs. 1–3, 5).
Campanularia johnstoni Alder, 1856: 359, pl. 13 (fig. 8). Vervoort, 1959: 312.
Clytia raridentata: Vanhöffen, 1910: 301, fig. 22. Fraser, 1944: 145, pl. 26 (fig 118). Millard, 1957: 197.
Campanularia raridentata: Stechow, 1919: 58, fig. Q.
Thaumantias raridentata: Stechow, 1923*a*: 107, fig. M. Stechow, 1925*b*: 426.
Clytia gracilis: Stechow, 1925*b*: 431, figs. 9–10. Millard, 1957: 196. Millard, 1958: 172, fig. 3B, E, G.
Clytia johnstoni: Ralph, 1957: 820, 823, figs. 1*h–u*, 2, 3*a–f*. Millard, 1958: 172, fig. 3A, D, F.
Laomedea (Phialidium) pelagica: Vervoort, 1959: 313, fig. 55*b*, *c*.

Records. West coast: SB 178C. TB 7, 16. South coast: LIZ 7T, 11K, 40K. MB 8N, 52K, 60N, 64P, 69B, 81W. SAMH 161, 166, 176, 180, 203, 239, 253, 383. SCD 5L, 37X, 50N, 52U, 56V, 61G, 75H, 79P, 84V, 129E, 179D, 265J, 283T, 284E, 330C, 387L, 394G. STJ 31M. TRA 57D, 92W, 159B.

Description. Numerous colonies growing on weeds and other hydroids. Stems solitary or occasionally sparsely branched, annulated at top and bottom and occasionally throughout.

Hydrotheca variable in size, with 8–15 marginal teeth. Teeth acute, sharp or rounded, but always covering a smaller area than the bays between them, often asymmetrical and leaning towards one side. Diaphragm distinct, variable in thickness, but always clearly demarcated from the hydrothecal wall.

Gonotheca generally smooth, with truncated distal end, but sometimes with 1 or 2 irregular corrugations; none of these specimens with distinct annulations.

Remarks. Ralph has demonstrated for *Clytia johnstoni* in New Zealand a variation in size, shape of marginal teeth and degree of annulation on the gonotheca which can be correlated with latitude. While specimens from the southern region correspond to the classical conception of *C. johnstoni*, with annulated gonothecae and broad marginal teeth, those from the northern region have smooth gonothecae and acute marginal teeth and thus cover the form known as *C. gracilis*. We thus have no alternative but to combine the two species. So far as is known there is no difference between the medusae. The range of variation also covers material from South Africa recorded as *C. raridentata*, which is here considered a synonym. See also remarks on p. 477.

Since the latitude on the south coast of Africa is the same as that of the north end of New Zealand, it might be expected that the material in these

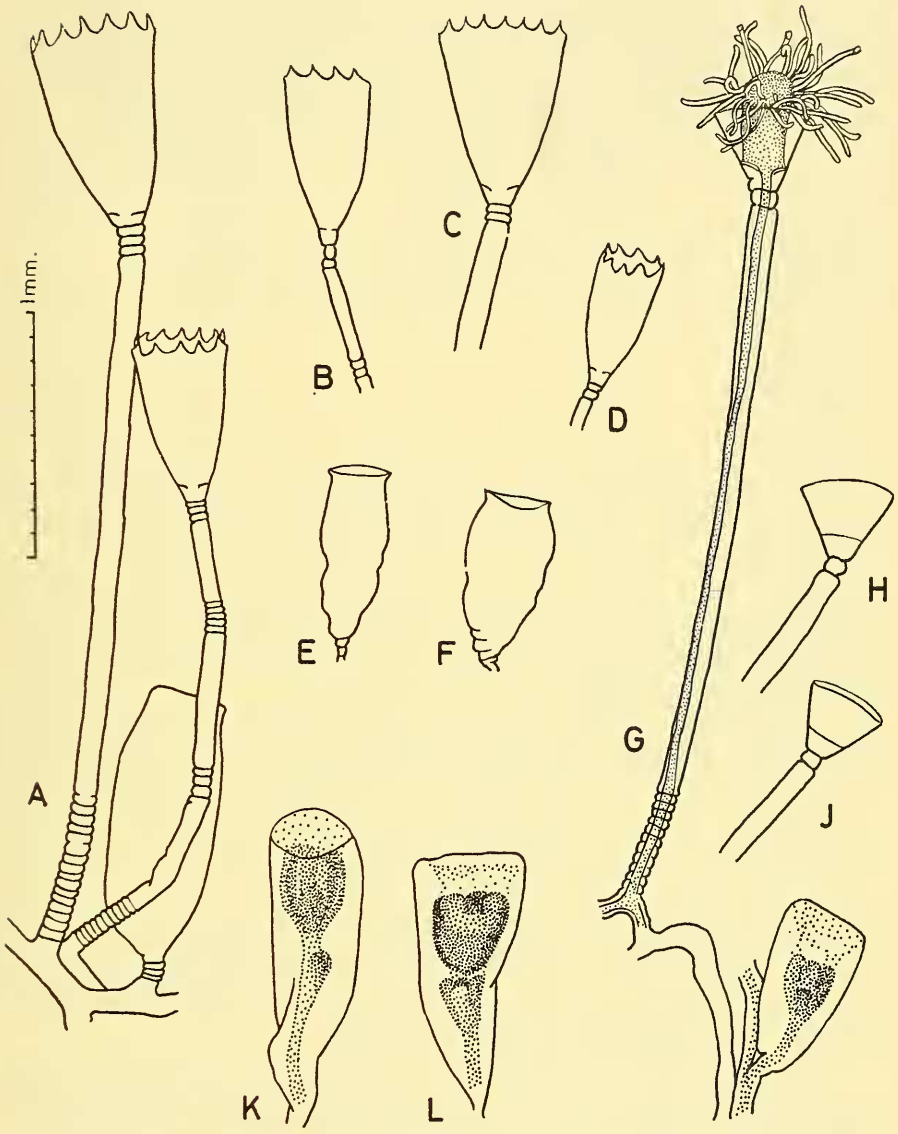

FIG. 14. *Clytia hemisphaerica* (Linn.) (A–F), and *C. hummelincki* (Leloup) (G–L).

A–D. Various hydrothecae showing variation in total size and shape of marginal teeth: A with triangular teeth, B and D with asymmetrical teeth and C with very slender teeth.
E and F. Gonothecae, corrugated type (a smooth one shown in A).
G. A hydrotheca containing a hydranth, and a gonotheca.
H and J. Empty hydrothecae.
K and L. Gonothecae containing young medusae.
(A from TB 16, B from TRA 57D, C from Natal, D–F from False Bay, G–L from SCD 328H.)

two regions would be similar, and that the variation in South Africa would continue from where it left off in New Zealand as one moves up the east coast into warmer waters. This was tested out in the material available and measurements of hydrothecal size and pedicel length are given below.

	Hydrotheca: height (mm.)		*Pedicel: length (mm.)*	
	Range	Mean	Range	Mean
West coast (32–34° S)	0·6–1·0	0·8 (16)	0·7–3·4	2·4 (16)
South coast (34–35° S)	0·4–0·9	0·6 (40)	0·5–5·7	1·9 (39)
East coast (32–28° S)	0·4–0·8	0·6 (32)	1·6–3·8	2·5 (20)
Portuguese East Africa (27–23° S)	0·3–0·6	0·5 (23)	0·4–1·6	1·0 (18)

These figures show that the hydrothecal height from the south coast corresponds well with that from a similar latitude in New Zealand (Ralph gives measurements of 0·40–0·81 mm. between 40° S and 34° S) and that there is a clear decrease in size from the west coast (where the water is colder than the south coast) round the south and up the east coast. A similar trend in pedicel length is not so clear, although pedicels from Portuguese East Africa are certainly shorter than elsewhere. No tendency for a change in the proportions of the hydrotheca was seen.

The marginal teeth are always acute in South African material as in northern New Zealand, and on the east coast there is a tendency for the bays between them to become larger and the teeth narrower (fig. 14C).

With one exception the gonothecae are quite smooth or with a few irregular corrugations, as in those illustrated by Ralph from northern New Zealand. This is as might be expected, and it is difficult to account for the single sample where all gonothecae are distinctly annulated (6–8 rings) described from Portuguese East Africa as *C. johnstoni* (Millard, 1958, fig. 3D).

The variable nature of the gonotheca explains the discrepancy which exists in the literature over the nature of the gonotheca of *Clytia* (*Thaumantias*) *raridentata* (cp. Fraser, 1944, and Stechow, 1923*a*).

The nature of the diaphragm allows for no differentiation between species, and, although variable in thickness, it is always distinct from the hydrothecal wall and thus different from the type characteristic of the genus *Campanularia*.

Clytia hummelincki (Leloup, 1935)
Fig. 14 G–L

Laomedea hummelincki Leloup, 1935: 19, fig. 7.

Records. South coast: SCD 328H.

Description. A rich colony growing on the surface of *Lepas* sp. taken from a buoy. Colony stolonic, stem unbranched, long, closely annulated in basal

region and often for short areas at other irregular intervals, otherwise smooth, with a single, rather flattened 'spherule' at distal end.

Hydrotheca in the shape of an inverted cone and usually with straight sides, expanding evenly to margin, with height approximately equal to maximum diameter. Margin untoothed. Diaphragm very delicate, usually oblique. Hydranth with 15–29 tentacles, completely retractable into hydrotheca.

Gonotheca arising separately from hydrorhiza on a short pedicel of 2–4 segments, elongated and expanding to distal end which is truncated, containing 1 or 2 medusa buds. Oldest medusa deep, with manubrium, 4 radial canals and 4 tentacle bulbs visible.

Measurements (mm.)

Pedicel, length	1·92–4·73
maximum diameter	0·09–0·15
Hydrotheca, length	0·25–0·38
diameter at margin	0·22–0·42
length/diameter	0·70–1·36
Gonotheca, length	0·73–1·26
maximum diameter	0·28–0·45

Remarks. This material agrees entirely with Leloup's description of *Laomedea hummelincki* from the West Indies, except that these pedicels are somewhat longer and stouter. The nature of the diaphragm and the presence of medusa buds in the gonotheca (observed here for the first time) shows the species to be a *Clytia*. This is only the second record of this rare species, and a new record for South Africa.

Clytia paulensis (Vanhöffen, 1910)

Fig. 15

Campanularia paulensis Vanhöffen, 1910: 298, fig. 19 *a*, *b*.
Clytia paulensis: Stechow, 1919: 45, 155. Stechow, 1923*a*: 110, fig. N. Stechow, 1925*b*: 428, fig. 7. Stechow, 1925*a*: 211.
?Clytia ulvae Stechow, 1919: 47, fig. N. Stechow, 1925*b*: 428.

Records. South coast: LIZ 11M. SAMH 336. SCD 79N, 154G, 258W, 276U, 333D, 387M. TRA 38K.

Description. Several colonies growing on the stems of other hydroids. Stem unbranched, or giving rise to 1 or 2 secondary pedicels in a sympodial manner, closely annulated at base, in distal region and at irregular intervals between.

Hydrotheca very thin and fragile, with 7–10 double marginal teeth. Margin bowed out between teeth giving an undulating outline in end-on view and sometimes the effect of longitudinal striations in the upper part of the hydrotheca. Depth of hydrotheca $1\frac{3}{4}$ to $3\frac{1}{4}$ times diameter at margin.

Gonotheca as described by Stechow: smooth and fragile, with annulated pedicel and truncated distal end, containing 1–3 medusa buds.

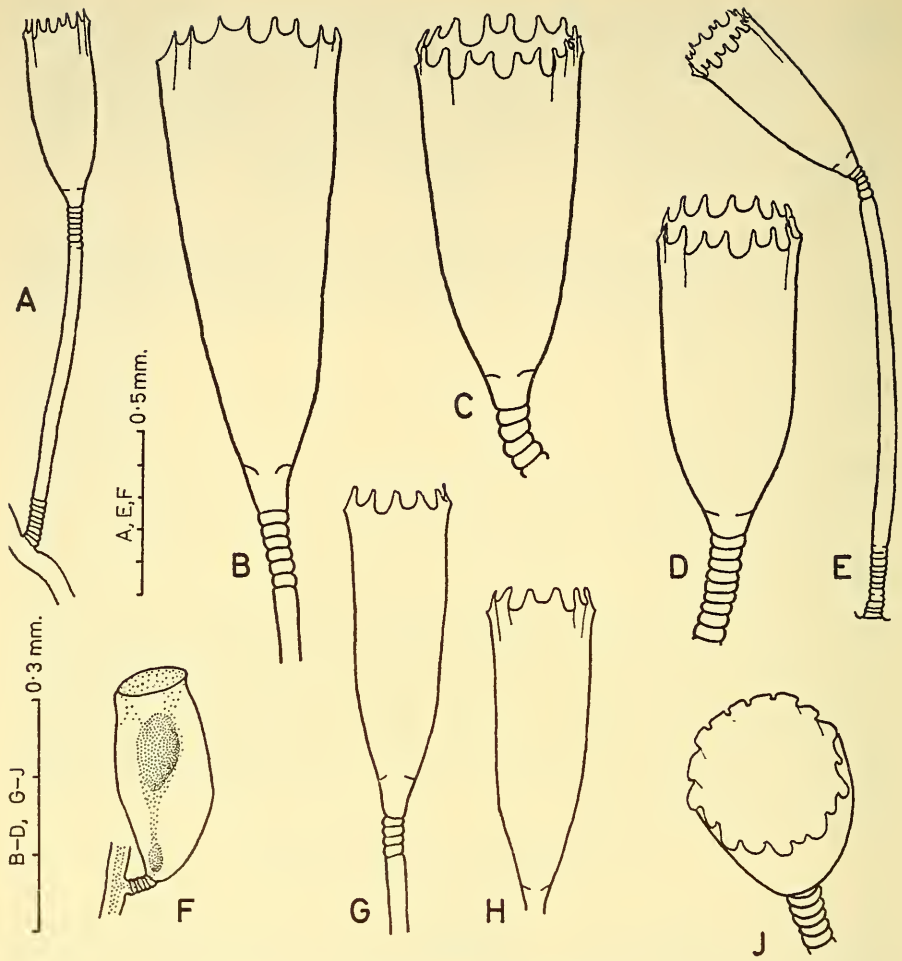

Fig. 15. *Clytia paulensis* (Vanhöffen).

A–E and J. Hydrothecae.
F. Gonotheca.
G and H. Hydrothecae drawn from Stechow's slide of *Clytia ulvae* from Marseilles, 1910.

Measurements (mm.)

	SAMH 336	TRA 38K	SCD 258W	SCD 333D	SCD 154G	*Clytia ulvae* (Marseilles)
Pedicel length . .	0·57–1·14	0·48–1·82	0·52–0·94	0·91–1·13	0·85–1·00	0·22–0·90
maximum diameter	0·04–0·06	0·04–0·06	0·04–0·05	0·045–0·05	0·035	0·03–0·035
Hydrotheca, length .	0·35–0·58	0·41–0·72	0·45–0·69	0·53–0·68	0·42–0·50	0·35–0·44
diameter at margin .	0·16–0·33	0·19–0·31	0·15–0·28	0·21–0·25	0·15–0·16	0·12–0·14
length/diameter .	1·76–2·47	1·90–2·68	2·17–3·07	2·20–3·10	2·80–3·13	2·71–3·23
Gonotheca, length .	—	0·715	0·66–1·00	—	—	—
maximum diameter	—	0·385	0·30–0·36	—	—	—

Remarks. Measurements taken from different localities show that the size and proportions of the hydrotheca are very variable. Vanhöffen's material from the Antarctic is well within range, while some of Stechow's material from South Africa (1925*b*) and Australia (1925*a*) is a little smaller, though the proportions are similar.

It is highly probable that *Clytia ulvae* Stechow, 1919, is a synonym for *C. paulensis*. I have been able to examine a prepared slide of Stechow's material of *C. ulvae* from Marseilles kindly loaned by the Munich Museum and find that the marginal teeth are in fact double (fig. 15G, H), though the bays between members of a pair are almost as large as those between pairs. However, the depth of the former bays is variable within a single colony of *C. paulensis* so that the small teeth may be $\frac{1}{3}$ to $\frac{2}{3}$ the size of the large double teeth. I have included measurements of Stechow's material (taken by myself) for comparison. These show that the hydrothecae are slightly narrower and the proportion of length/diameter in consequence slightly greater, though the material might well fit near the end of a series of changing proportions arranged as above.

Obelia dichotoma (Linn., 1758)

Obelia dichotoma: Millard, 1952: 420, 426, 433, fig. 3. Millard, 1957: 198. Millard, 1958: 174. Millard, 1959*b*: 250.
Obelia dubia: Vanhöffen, 1910: 307, fig. 27. Nutting, 1915: 77, pl. 19 (fig. 1). Stechow, 1925*b*: 435. Fraser, 1937: 86, pl. 17 (fig. 87).
Campanularia obtusidens Jäderholm, 1904: 2, pl. 1 (fig. 1).

Records. West coast: CP 378. LAM 46P. LB 378F. OLF 21C. SAMH 404, 405. TB 8. South coast: KNY 165C (recorded by Day, Millard and Harrison, 1952). LIZ 2G, 11J. MB 37D, 81V. SAMH 147, 160, 223, 338, 342. SCD 112G, 258V, 281D, 312C. TRA 38L, 42W.

Remarks. Obelia dubia is considered to be a synonym for *O. dichotoma*. The South African material shows all grades of hydrothecal types from the typical *O. dichotoma* form where the marginal teeth are usually not distinct to that of *O. dubia* as illustrated by Jäderholm (1904) and Vanhöffen (1910), where there are distinct marginal teeth and indications of longitudinal striations. It is impossible to draw a dividing line between them. The hydrothecal pedicel is extremely variable in length and the diaphragm may be straight or oblique within the same colony.

The gonothecae of *O. dubia* were illustrated by Fraser (1937) and are said to be 'almost smooth, or provided with broad, shallow undulations'. In the South African material the gonothecae are usually smooth, but examples are also present (with the typical *dichotoma* hydrothecae) where the gonothecae are corrugated, approaching very closely the type illustrated by Fraser.

Obelia geniculata (Linn., 1758)

Obelia geniculata: Millard, 1957: 198. Millard, 1959*b*: 250.

Records. West coast: A 383 (reported by Bright, 1938). CP 325. LAM 24H. LB 127, 314G, 371B. PP 1V. SAMH 357. SB 168G, 235J. TB 6A. TRA 86P. WCD 81G. South coast: TRA 42V.

Summary

A total of 43 species of hydroids is recorded, including 25 Gymnoblasts and 18 Calyptoblasts. Of these 5 are new species, namely *Monocoryne minor*, *Myriothela tentaculata*, *Bicorona elegans*, *Aequorea africana and Campanularia laminacarpa*, and 8 are new records for the Republic of South Africa.

The new genus *Bicorona* is established for a Corynid species with 2 whorls of tentacles and fixed sporosacs.

The status of the Campanularian genus *Clytia* is discussed and a type species selected.

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